

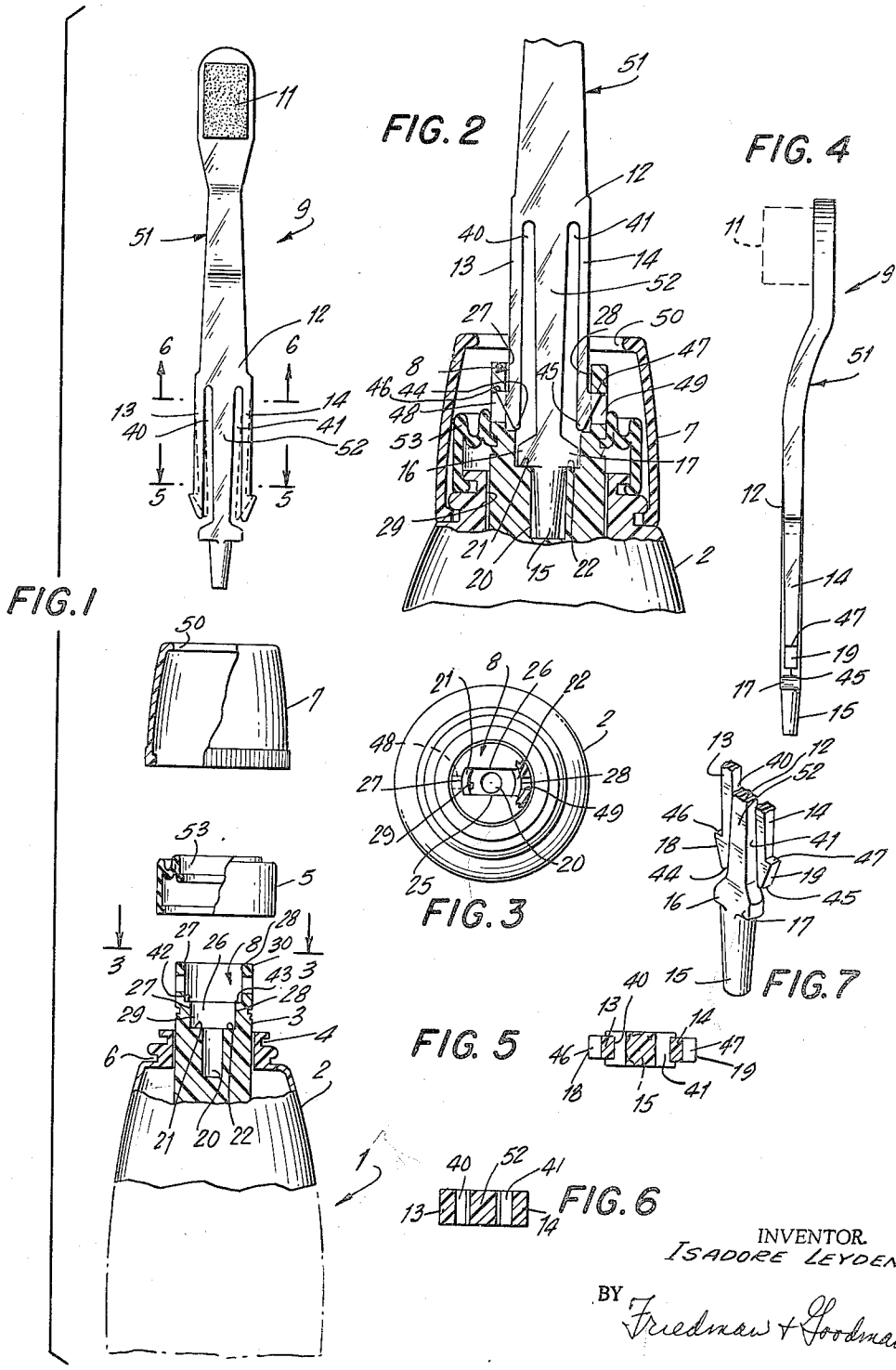
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POWER OPERATED TOOTHBRUSH

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**POWER OPERATED TOOTHBRUSH**

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This invention relates to a power operated toothbrush and more particularly to an improved arrangement for detachably securing a toothbrush to a power operated unit.

Power operated toothbrushes made up of a combination of a power unit and a detachably secured toothbrush provide a very valuable aid to proper dental hygiene. However the extent of their use has heretofore been limited by the comparative difficulty of securing and removing the brush from the unit. It is also desirable to have a plurality of easily interchangeable brushes so that a single power unit may be used by different persons. Therefore a power operated toothbrush which provided a readily removable interchangeable and easily attachable toothbrush element is highly desirable.

It is, therefore, the primary object of this invention to provide an improved arrangement for easily and readily detachably securing a toothbrush to a power operated unit.

It is a further object of this invention to provide an improved toothbrush construction simple in structure and easily manufactured.

It is a further object of this invention to provide an improved detachable toothbrush with improved control in the transfer of motion from the toothbrush power unit to the toothbrush.

It is a further object of this invention to provide improved means for the positioning of the detachably secured toothbrush with respect to the power operated unit.

It is a further object of this invention to provide improved and simple means for preventing relative motion between the detachably secured toothbrush unit and the power operating unit.

Other objects and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing in which:

FIGURE 1 is an exploded view, partly broken away and partly in section, showing the elements composing the toothbrush and the operating elements therefor;

FIGURE 2 is a fragmentary longitudinal cross section, on an enlarged scale, showing the toothbrush element of the present invention positioned within and in engagement with a clutch or holding element of a power unit;

FIGURE 3 is a view, on an enlarged scale, taken in a horizontal plane represented by line 3-3 of FIGURE 1;

FIGURE 4 is a side elevational view of the toothbrush element shown in FIGURE 1;

FIGURE 5 is a cross sectional view, on an enlarged scale, of the toothbrush element taken in a horizontal plane along line 5-5 of FIGURE 1;

FIGURE 6 is a cross sectional view, on an enlarged scale, of the toothbrush element taken in a horizontal plane along line 6-6 of FIGURE 1; and

FIGURE 7 is a fragmentary perspective view of the lower end of the toothbrush element of the present invention.

Referring now to FIGURE 1 in detail, there is shown a power operated toothbrush comprising a suitable power unit 1 provided within a power unit housing 2, said power unit 1 driving a power operated member or chuck 3 in a suitable manner.

To provide easy accessibility for cleaning or any other purposes and to minimize the possibility of the entrance

of water or other materials into the power unit, power unit housing 2 is provided with annular groove 4 for detachably securing and holding hollow boot element 5 and with annular groove 6 for detachably securing and holding hollow cap element 7, as shown more particularly in FIGURE 2.

The power operated member or chuck 3 preferably formed of a suitable molded plastic material is provided with an opening or socket 8 integrally formed at the upper end of said power operated member 3 and terminating in a cylindrical receptacle portion 20, abutment shoulder receiving portion 29 and resilient finger receiving portion 30 with front side wall 25, rear sidewall 26 and left sidewall 27 and right sidewall 28.

As will be more particularly described hereafter, socket 8 is generally shaped and adapted to receive and detachably secure the toothbrush element 9. Toothbrush element 9 is provided with a shank 51 which has a bristle brush 11 at its forward end and an integral shank extension 12 at its rearward end.

In order to provide a unique and improved arrangement for accurately, rapidly and conveniently positioning and detachably securing the toothbrush element 9 to the power operated member 3, the rearward shank portion 12 of toothbrush element 9 while generally shaped to be complementary to socket 8 is provided with longitudinal openings or recesses 40 and 41, a central shank projection 52 and resilient fingers 13 and 14, oppositely disposed relative to central shank projection 52, and extending rearwardly from the forward portions of openings 40 and 41, as shown in FIGURES 1, 2 and 6, and integrally formed with the shank portion 12. Said resilient fingers are of sufficient length to enable them to be grasped and squeezed together with the necessary pressure applied by the fingers of one hand, when the toothbrush element is to be removed from engagement in the socket 8 as appears more particularly in FIGURE 2.

As shown more particularly in FIGURE 7, the rearward portion of shank projection 52 terminates in a frusto-conical guide post 15 provided with two oppositely disposed abutment shoulders 16 and 17. Resilient fingers 13 and 14 terminate in inclined projections or latches 18 and 19.

Resilient fingers 13 and 14 are each tapered toward the rearward end of the toothbrush 9 as appears more particularly for resilient finger 14 in FIGURE 4.

Referring more particularly to FIGURES 2 and 3, socket 8 terminates in cylindrical opening or receptacle 20 which is of sufficient depth and diameter to receive and mate with the frusto-conical guide post 15. At the top of the cylindrical opening or receptacle 20 detent and positioning shoulders 21 and 22 are provided for stopping and properly positioning the toothbrush element 9 upon insertion into the socket 8 of the power driven member 3. Stop shoulders 21 and 22 are shaped and dimensioned so as to mate with, stop and position the abutment shoulders 16 and 17 respectively.

At the top of the abutment shoulder receiving portion or receptacle 29 of socket 8, resilient finger stop shoulders 42 and 43 are provided to aid in properly positioning and securing the toothbrush element 9.

As is apparent from FIGURE 2, the distance between left sidewall 27 and right sidewall 28 of the resilient finger receiving receptacle or portion 30 is greater than the distance between the outer ends of the abutment shoulders 16 and 17. The distance between left sidewall 27 and right sidewall 28 is also greater than the distance between the terminal ends 44 and 45 of resilient fingers 13 and 19 when said resilient fingers are in their neutral or relaxed position, but is less than the distance between the upper

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ends or ears 46 and 47 of projections 18 and 19, respectively, on the resilient fingers 13 and 14.

Left and right sidewalls 27 and 28 are provided with transverse openings 48 and 49, respectively.

As shown in FIGURES 1, 2 and 3, transverse openings 43 and 49 extend completely through sidewalls 27 and 28 respectively. It should be understood, however, that they may be of other sizes or shapes as long as they accommodate projections 18 and 19 respectively.

Due to the above described construction, as the shank portion 12 of toothbrush 9 is inserted into the socket 8, projections 18 and 19 abut and slide upon the left and right sidewalls 27 and 28 respectively, and the resilient fingers 13 and 14 will be moved inwardly or converge against the inherent resilient force or bias of said resilient fingers 13 and 14.

As shown in FIGURE 2, the detent or positioning shoulders 21 and 22 are so located with respect to, or spaced from, the transverse openings 48 and 49 that when the abutment shoulders 16 and 17 are stopped or engaged by the stop or positioning shoulders 21 and 22, the tops or ears 46 and 47 of projections 18 and 19 of the resilient fingers 13 and 14 will be in accurate registry with the upper ends of the transverse openings 48 and 49, respectively, whereby the ears 46 and 47 will snap engage into the transverse openings 48 and 49, respectively, due to the resilient force of the stressed resilient fingers 13 and 14, thus accurately positioning and detachably securing or latching the toothbrush element 9 and the holder or chuck element 3.

As shown in FIGURE 4, in order to provide the proper resiliency characteristics and to enable easy insertion resilient fingers 13 and 14 are tapered toward the rearward end of the toothbrush 9.

As is apparent from FIGURES 1 and 2, inward pressure upon the outer surfaces of resilient fingers 13 and 14 will temporarily bend the resilient fingers 13 and 14 toward the central shank projection 52 to release the eared projections 18 and 19 from their latched position illustrated in FIGURE 2. Thus by merely grasping the resilient fingers 13 and 14 above cap 7 and applying a slight finger pressure to their outer surfaces the toothbrush 9 is readily and easily removed from the chuck or holder 3 by withdrawing the toothbrush through the top opening 53 in boot 5 and through the top opening 50 in cap 7.

Because of the tapered construction of the frusto-conical guide post 15 and the resilient fingers 13 and 14 any water or foreign material which may be present in socket 8 at the time of insertion of the toothbrush 9 is readily forced out.

From the foregoing description, it is readily understood that the improved arrangement for detachably securing a toothbrush to a power operated unit is simple in structure and may be easily and inexpensively manufactured. The chuck 3 with its socket 8 including the cylindrical receptacle portion 20, abutment shoulder receiving receptacle portion 29 and resilient finger receiving receptacle portion 30 may be molded in a simple operation. Shank projection 52 provided with the frusto-conical guide post 15, the abutment shoulders 16 and 17, the resilient fingers 13 and 14 with the inclined eared projections 18 and 19 may all be formed in a single operation integral with toothbrush shank 51. As best seen in FIGURES 3, 5, 6 and 7, the shank extension 52 and fingers 13 and 14 have been shown as substantially rectangular in cross section so as to limit the proper insertion of the brush into the socket to either of two directions. However, it is obvious that the various parts may be constructed substantially circular or square in cross section, and with the provision of properly located level transverse openings, provision may be made for the insertion of the toothbrush in additional directions.

While there has been shown and described a particular embodiment of this invention, it is obvious to those skilled in the art that the various changes and modifications can

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be made therein without departing from the concept of the invention, and therefore it is intended in the appended claims to cover all changes and modifications as are within the spirit and scope of the invention.

I claim:

1. A power operated toothbrush comprising, a member adapted to be driven from a source of power, a socket formed at one end of said member and having an entrance opening for receiving a toothbrush, opposing openings defined in said socket inwardly of said entrance opening, a toothbrush having a forward bristle portion and a rearward shank portion, said shank portion having a pair of laterally spaced resilient elements and a central element between said resilient elements, said central and resilient elements extending rearwardly from said shank portion for reception within said socket, each of said resilient elements terminating in a latch portion for insertion into one of said opposing openings, and cooperating means provided on said socket and on said central element for guiding said resilient elements during insertion into said socket and for disposing said latches in predetermined disposition within said socket to effect snap engagement of said latches into said openings, said cooperating means comprising means defining a recess in said socket remote from said entrance opening, said recess having opposing shoulders at the entrance thereof, said central element extending beyond said resilient elements and having a guide post at the forward end thereof adapted to enter said socket recess, and said guide post having opposing detent shoulders remote from the free end thereof adapted to engage said recess shoulders when said guide post is inserted into said socket recess whereby to dispose said latches for snap engagement into said socket openings.

2. A power operated toothbrush comprising, a member adapted to be driven from a source of power, a socket formed at one end of said member and having an entrance opening for receiving a toothbrush, opposing openings defined in said socket, inwardly of said entrance opening, a toothbrush having a forward bristle portion and a rearward shank portion, said shank portion having a pair of laterally spaced resilient elements and a central element between said resilient elements, said central and resilient elements extending rearwardly from said shank portion, for reception within said socket, each of said resilient elements terminating in a latch portion for insertion into one of said opposing openings, and cooperating means provided on said socket and on said central element for guiding said resilient elements during insertion into said socket and for disposing said latches in predetermined disposition within said socket to effect snap engagement of said latches into said openings, said cooperating means comprising means defining a recess in said socket remote from said entrance opening, said recess having opposing shoulders at the entrance thereof, said central element extending beyond said resilient elements and having a guide post at the forward end thereof adapted to enter said socket recess, and said guide post having opposing detent shoulders remote from the free end thereof adapted to engage said recess shoulders when said guide post is inserted into said socket recess whereby to dispose said latches for snap engagement into said socket openings, said socket having bounding walls at the entrance thereof in which said opposing openings are defined, said opposing detent shoulders having a transverse dimension which is less than the transverse dimension between said bounding walls, said latch portions being rearwardly of said opposing detent shoulders and having a transverse dimension which exceeds the transverse dimension of said bounding walls, whereby said latch portions bear against said bounding walls during insertion into said socket for inward flexing said resilient elements to bias the latter to effect said snap engagement of said latches into said socket openings upon en-

gagement of said detent shoulders with said recess shoulders.

3. A power operated toothbrush comprising, a member adapted to be driven from a source of power, a socket formed at one end of said member and having an entrance opening for receiving a toothbrush, opposing openings defined in said socket inwardly of said entrance opening, a toothbrush having a forward bristle portion and a rearward shank portion, said shank portion having a pair of laterally spaced resilient elements and a central element between said resilient elements, said central and resilient elements extending rearwardly from said shank portion for reception within said socket, each of said resilient elements terminating in a latch portion for insertion into one of said opposing openings, and cooperating means provided on said socket and on said central element for guiding said resilient elements during insertion into said socket and for disposing said latches in predetermined disposition within said socket to effect snap engagement of said latches into said openings, said cooperating means comprising means defining a recess in said socket remote from said entrance opening, said recess having opposing shoulders at the entrance thereof, said central element extending beyond said resilient elements and having a guide post at the forward end thereof adapted to enter said socket recess, and said guide post having opposing detent shoulders remote from the free end thereof adapted to engage said recess shoulders when said guide post is inserted into said socket recess whereby to dispose said latches for snap engagement into said socket openings, said socket having bounding walls at the entrance thereof in which said opposing openings are defined, said opposing detent shoulders having a transverse dimension which is less than the transverse dimension between said bounding walls, said latch portions being rearwardly of said opposing detent shoulders and having a transverse dimension which exceeds the transverse dimension of said bounding walls, whereby said latch portions bear against said bounding walls during insertion into said socket for inward flexing said resilient elements to bias the latter to effect said snap engagement of said latches into said socket openings upon engagement of said detent shoulders with said recess shoulders, said latch portions comprising inwardly inclined ears having free ends, and additional detent shoulders provided in said socket rearwardly of said openings therein for engagement by said free ends upon snap engagement of said ears into said socket openings.

4. A power operated toothbrush comprising, a member adapted to be driven from a source of power, a socket formed at one end of said member and having an entrance opening for receiving a toothbrush, opposing openings defined in said socket, inwardly of said entrance opening, a toothbrush having a forward bristle portion and a rearward shank portion, said shank portion having a pair of laterally spaced resilient elements and a central element between said resilient elements, said central and resilient elements extending rearwardly from said shank portion, for reception within said socket, each of said resilient elements terminating in a latch portion for insertion into one of said opposing openings, and cooperating means provided on said socket and on said central element for guiding said resilient elements during insertion into said socket and for disposing said latches in predetermined dis-

position within said socket to effect snap engagement of said latches into said openings, said cooperating means comprising means defining a recess in said socket, said recess having opposing shoulders at the entrance thereof, said central element extending beyond said resilient elements and having a guide post at the forward end thereof adapted to enter said socket recess, and said guide post having opposing detent shoulders remote from the free end thereof adapted to engage said recess shoulders when said guide post is inserted into said socket recess whereby to dispose said latches for snap engagement into said socket openings, said socket having bounding walls at the entrance thereof in which said opposing openings are defined, said opposing detent shoulders having a transverse dimension which is less than the transverse dimension between said bounding walls, said latch portions being rearwardly of said opposing detent shoulders and having a transverse dimension which exceeds the transverse dimension of said bounding walls, whereby said latch portions bear against said bounding walls during insertion into said socket for inward flexing said resilient elements to bias the latter to effect said snap engagement of said latches into said socket openings upon engagement of said detent shoulders with said recess shoulders, said socket recess having a cylindrical conformation and said guide post having a frusto-conical conformation.

5. A toothbrush comprising an elongated member provided with a bristle portion at one end thereof and a shank portion at the other end thereof, said shank portion having a pair of laterally spaced rearwardly extending resilient elements, and each element terminating in a latch portion, and said shank portion being provided with a central guide element disposed between said resilient elements and extending beyond said latch portions, said central guide element terminating in an integral guide post and having a pair of laterally extending shoulders spaced from the free end of said guide post.

6. A toothbrush comprising an elongated member provided with a bristle portion at one end thereof and a shank portion at the other end thereof, said shank portion having a pair of laterally spaced rearwardly extending resilient elements, and each element terminating in a latch portion, and said shank portion being provided with a central guide element disposed between said resilient elements and extending beyond said latch portions, said central guide element terminating in an integral guide post and having a pair of laterally extending shoulders spaced from the free end of said guide post, said guide post having a frusto-conical conformation.

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