Sept. 13, 1966 L. F. SAWYER 3,271,805

TOOTHBRUSH HAVING A REMOVABLE BRUSH HEAD

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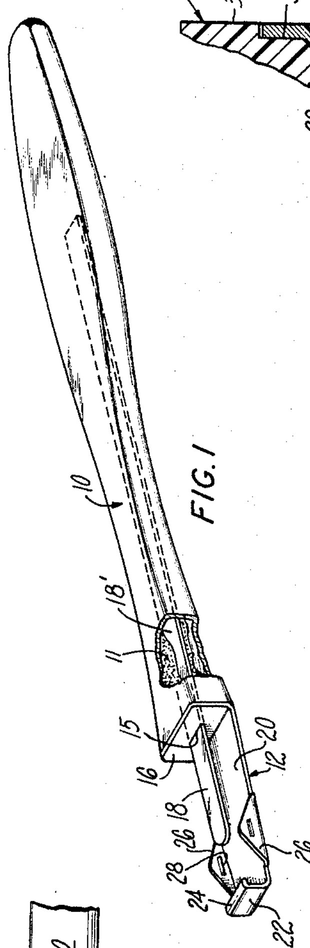


FIG. 1

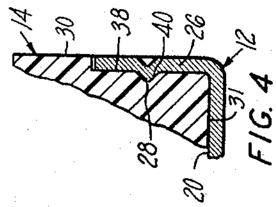


FIG. 4

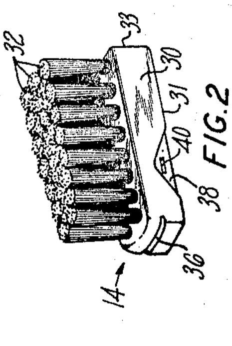


FIG. 2

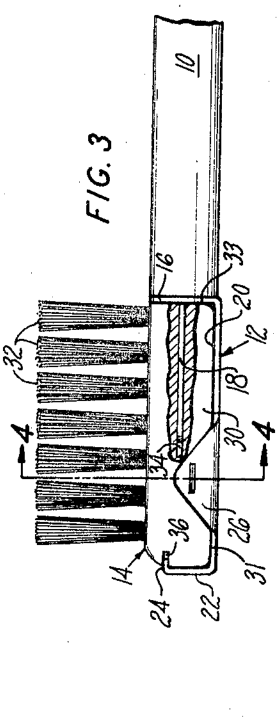


FIG. 3

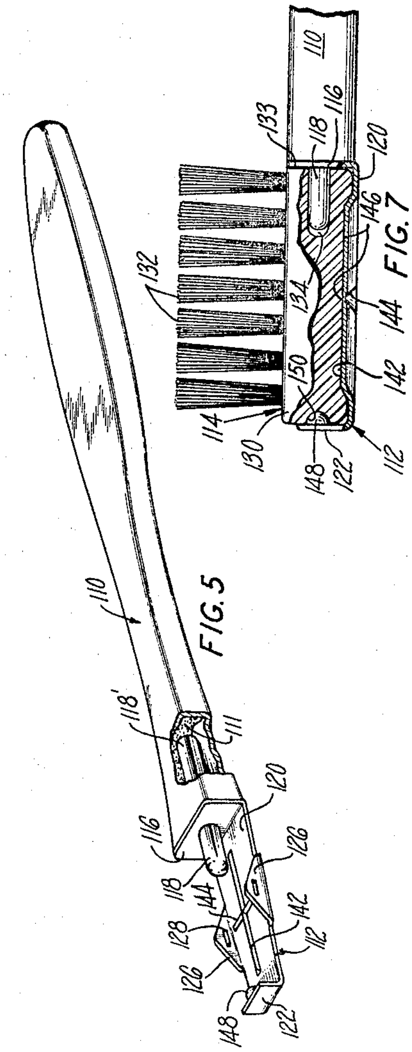


FIG. 5

FIG. 7

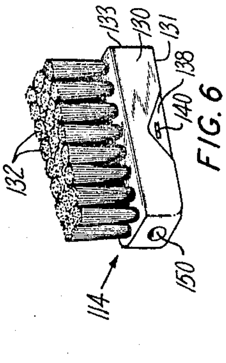


FIG. 6

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TOOTHBRUSH HAVING A REMOVABLE BRUSH HEAD

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This invention relates to an improvement in toothbrushes and more particularly to an improvement in manual toothbrushes of the type in which a brush head is mounted on one end of the handle so that the brush head can be readily removed and replaced by a new brush head at the discretion of the user.

The principal aim of this invention is to provide an improved toothbrush wherein a replaceable brush head can be rigidly secured to an integral unit so as to withstand a heavy scrubbing action and yet be expeditiously removed when the occasion is warranted. Included in this object is the provision of an improved toothbrush which can be easily cleaned and even sterilized, if required, without deformation of the toothbrush and which has a sealed handle impervious to bacterial formation.

Another aim of this invention is to provide an improved toothbrush with a removable brush head to be supplied in a variety of colors and stiffness of bristles with considerable cost savings and usefulness to the purchaser, resulting in a toothbrush assembly having notable advantages in the home, while traveling or in the event of oral complications and which will be attractive in appearance.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which is exemplified in the construction hereafter set forth, and the scope of the invention is indicated in the appended claims.

In the drawing:

FIG. 1 is a perspective view, partly broken away, of a handle of one embodiment of a toothbrush constructed in accordance with the present invention;

FIG. 2 is a perspective view of a brush head for use with the handle shown in FIG. 1;

FIG. 3 is a fragmentary side view, partly broken away, of the brush head and handle of FIGS. 1 and 2 in assembled relationship;

FIG. 4 is an enlarged fragmentary cross-sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a perspective view of another embodiment of a handle according to the present invention;

FIG. 6 is a perspective view of a brush head for use with the handle shown in FIG. 5; and

FIG. 7 is a fragmentary side view partially in longitudinal cross section of the brush head and handle of FIGS. 5 and 6 in assembled position.

Referring first to that form of the present invention shown in FIGS. 1–4, inclusive, an elongated hollow metallic handle **10**, made from stainless steel, for example, is illustrated in FIG. 1 having a holding device **12** at one end for receiving a removable brush head **14** of the type shown in FIG. 2. In order to provide expeditious and economical manufacture, the holding device **12** is designed entirely as an integral unit to be stamped from a thin, flat blank of resilient material, such as spring stainless steel, prior to being fixed to the handle **10**. The holding device **12** is formed with a rectangular rear wall or abutment **16** to abut the terminal portion of the handle **10** so that they may be permanently welded together to form a seal. As best seen in FIG. 3, the abutment **16** is shown as being generally perpendicular to the axis of the handle **10**.

To insure that the brush head **14** will be firmly and rigidly held in the holding device **12**, a flat, blade-like projection or tongue **18** of rectangular cross section extends forwardly through a slot **15** in the abutment **16** at approximately the central axis of the handle **10**. The tongue **18** is securely held by its extension **18'** embedded in the handle **10**, which preferably is filled with a souerizing compound as indicated at **11**. To further prevent relative movement of the tongue **18** within the slot **15** and bacterial growth within the handle **10**, the tongue **18** is welded to those portions of the abutment **16** defining the slot **15**.

To form a support for the brush head **14** and at the same time to facilitate easy insertion and removal thereof, a displaceable base plate **20** is provided extending forwardly from the abutment **16** generally parallel to, but offset from the axis of the handle **10** for engagement with the bottom of the brush head **14**. In the specific embodiment, the base plate **20** is made integral with the abutment **16** and is formed of flexible sheet metal.

A holding flange **22** is integrally formed at the outer end of the holding device **12** opposite to the abutment **16**. Preferably, the flange **22** is bent upwardly at right angles with the smallest possible radius at the bend so as to form a generally rectangular seat for the brush head **14**. The upper end of flange **22** terminates in an inwardly turned edge portion **24** facing the abutment **16**.

Additional rigidity is obtained by providing side flanges **26** of generally triangular shape projecting upwardly from each side of the spring base plate **20** adjacent the flange **22** so as to preclude displacement of the forward end of the brush head **14**. A small inwardly extending ridge **28** is formed in each of the side flanges **26**, as best seen in FIG. 4. The outer surfaces of the flanges may be planar as shown or may be ridged to make it easier for the user to grasp the same during removal or replacement of the brush head **14**.

The removable brush head **14** as shown in FIGS. 2 and 3 comprises a bristle-holding base **30**, composed of a suitable plastic material, having the usual tufts of natural or synthetic bristles **32** extending from the top surface thereof. The bottom surface **31** is dimensioned so that it is generally coextensive with the spring base plate **20**. The rear end **33** likewise is preferably dimensioned so that it is coextensive with the abutment **16** of the holding device **12** whereby, upon being properly mounted, the base **30** forms a smooth continuation of the handle **10**, resulting in a pleasing unitary appearance. For accommodating the tongue **18** extending from the abutment **16**, a rectangular recess or socket **34** is formed extending longitudinally from the rear end **33** of the base **30**. Preferably, the tongue **18** and socket **34** are dimensioned so that the tongue **18** will fit snugly within the socket **34** and extend to a point more than halfway into the base **30**. The forward end of base **30** follows the contour of the inner surface of the flange **22** and has a groove **36** therein for receiving the edge **24** of flange **22** to lock the brush head **14** in assembled position. For receiving the side flanges **26** of the spring base plate **20**, the outer face of each side of the base **30** is notched as shown at **38** in a manner complementary to the side flanges **26**. As best seen in FIG. 4, the locking action is completed by the provision of an indentation **40** formed within each notch **38** for receiving the ridge **28** on the inner face of the side flanges **26**, thereby assuring a secure assembly which can withstand strong scrubbing actions without becoming dislodged.

In order to remove the brush head **14** from the holding device **12**, all that the user has to do is to insert

a thumbnail or a prying instrument behind the flange 22 or edge 24 so as to disengage the same from the brush head base 30 whereupon the spring base plate 20 may be readily flexed downwardly a sufficient distance (not more than about one-fourth inch) which will free the brush head 14 so that it can be removed by pulling the same forwardly and upwardly from the toothbrush. Most of the flexing of the spring base plate 20 during this operation will occur adjacent the juncture with the rear abutment 16 and will be well within the elastic limit of the spring metal so that the same will not take a set and will effectively return to the original position when released. To insert a new brush head 14 into the assembly, the procedure may be reversed; i.e., the spring base plate 20 is flexed downwardly so as to permit the brush head 14 to be inserted on the tongue 18 into seated position. Locking of the brush head 14 in place is indicated by the snap action occurring when the edge portion 24 engages the groove 36 and the ridges 28 snap into the indentations 40.

In the embodiment of the invention illustrated in FIGS. 5–7 inclusive, the same numerals, except that they have been increased by 100, have been utilized to identify like parts. In general, the handle 110 and holding device 112 are similar to that described in connection with the first embodiment and are similarly assembled. However, in this embodiment it will be noted that the tongue 118 is in the form of a round cylindrical pin and is of appreciably shorter length. A cylindrical socket 134 is formed in the base 130 for reception of the pin 118, and the socket 134 and pin 118 are dimensioned so that the pin 118 extends into the base 130 for a distance of less than half the length of the base 130 and preferably approximately only about one-fifth of that distance.

The spring base plate 120, in addition to having the side flanges 126, is formed with cross ribs 142 and 144 which impart additional rigidity thereto. At the same time, the base 130 of the brush head 114 is modified to provide recesses 146 in its lower surface to accommodate the cross ribs 142, 144 which also serve the purpose of further interlocking the brush head 114 with the holding device 112 and providing additional retention means for the assembly.

A further modification is that the forward flange 122 is provided with a rounded bead 148 thereon which is received in a rounded indentation 150 in the forward end of the base 130 of the brush head 114.

The embodiment shown in FIGS. 5–7 inclusive has certain advantages from the standpoint of economy and convenience of manufacture and also permits somewhat easier removal and replacement of the brush head 114 although there is some sacrifice in the strength and rigidity of the assembly.

The toothbrush of the present invention may be used with brush heads of various bristle configurations for a variety of purposes. When assembled, the toothbrush has a pleasing appearance in addition to being entirely free of crevices or other pockets which would interfere with cleanliness and maintenance. The brush heads are readily removable, and yet when the toothbrush is assembled, the brush head is held in place with sufficient strength and rigidity so as to permit strenuous usage without failure under ordinary conditions. Inasmuch as the handle and holding device may be used for long periods of time without replacement and only the brush heads need to be replaced as required, the toothbrush is economical to use since it can be maintained in good condition at all times at low cost merely by replacing the brush head.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. A toothbrush comprising a hollow handle, a brush head holding device fixed to one end of the handle, said brush head holding device having an end wall fixed to said one end of the handle, a base plate extending axially forwardly of the handle from one edge of the end wall, a flange at the outer end of the base plate having a rearwardly extending projection thereon, and a tongue extending forwardly from the end wall generally parallel to the base plate and having a fixed end portion extending rearwardly through an opening in said end wall and into the handle, the tongue being secured to portions of said end wall surrounding its opening for fixing the tongue against axial movement and for sealing the handle to prevent bacterial growth therein, and a separate brush head comprising a base seated on the base plate and having a longitudinally extending socket receiving the tongue, the base having one end engaging the end wall of the holding device and its opposite end being recessed to receive the projection on the flange, said base plate of the holding device being flexible for bending the base plate away from the tongue to permit the brush head to be inserted into and removed from the holding device.

2. The toothbrush of claim 1 including flange means formed on each side edge of said base plate extending upwardly therefrom to engage the sides of the base of the brush head, the latter having recess means formed in each side of its base for receiving said flange means, and projections extending from one of said flange and recess means with the other thereof having complementary indentations formed therein for receiving said projections.

3. A toothbrush comprising a hollow metal handle, a replaceable brush head having a generally rectangular base, a holding device for the brush head having an abutment sealing one end of the handle and engaging one end of the base of the brush head, a flexible base plate extending forwardly from one edge of the abutment engaging the bottom of the base of the brush head, a flange at the outer end of the base plate substantially at right angles thereto engaging the opposite end of the base of the brush head, a projection extending rearwardly from the end flange, a flange formed on each side edge of the base plate extending upwardly therefrom to engage the sides of the base of the brush head, a recess formed in each of side of the base of the brush head and in said opposite end thereof to receive said side flanges and the projection on said end flange of the base plate respectively, each of said side flanges having an inwardly projecting ridge and said side recesses of the brush head each having an indentation formed therein for receiving said inwardly projecting ridge, a tongue secured in the hollow handle and having a free end portion extending axially through the abutment in parallel spaced relationship with the base plate, said free end portion being of shorter length than the base plate but extending at least one-fifth the length thereof, and a longitudinal socket extending inwardly from said one end of the base and being dimensioned and configured to receive the tongue in close-fitting surface contact.

4. A removable brush head for use with a toothbrush of the type having a handle, a brush head holding device comprising an abutment fixed to one end of the handle, a flexible base plate extending forwardly from one edge of the abutment, a tongue extending forwardly from the abutment a distance shorter than the length of the base plate but at least one-fifth the length thereof, a flange at the outer end of the base plate having a rearwardly extending projection thereon, and a flange having an inwardly directed projection thereon formed on each side edge of the base plate intermediate its opposite ends, said brush head comprising a base having a generally rectangular shape, a socket in the base of the brush head extending axially inwardly from one end thereof a distance shorter than the length of the base

but at least one-fifth the length thereof, a recess formed in the opposite end and in the sides of the base of the brush head, said recesses in the sides of the base of the brush head being formed intermediate its opposite ends and extending from the bottom of the base upwardly thereof, and an indentation formed in said recesses in the sides of the base of the brush head.

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