June 23, 1942. A. RICKENBACHER 2,287,327

TOOTHBRUSH

Filed Nov. 12, 1940

Fig. 1.

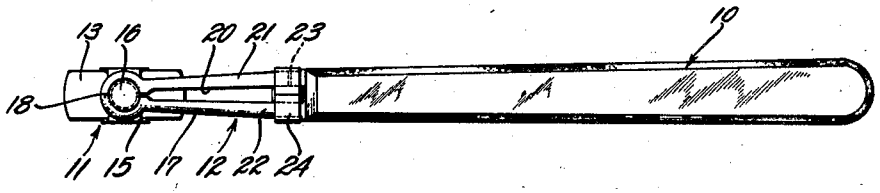


Fig. 2.

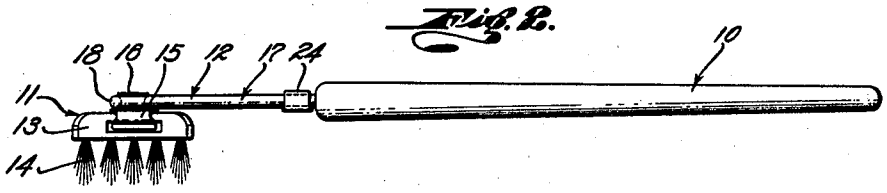


Fig. 3.

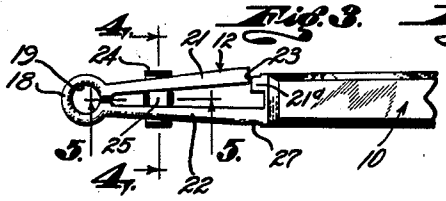


Fig. 4.

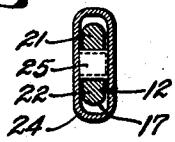


Fig. 5.

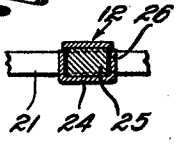


Fig. 6.

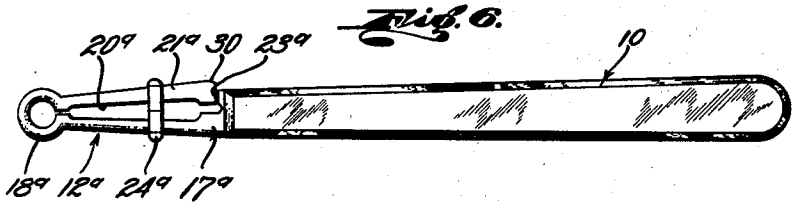
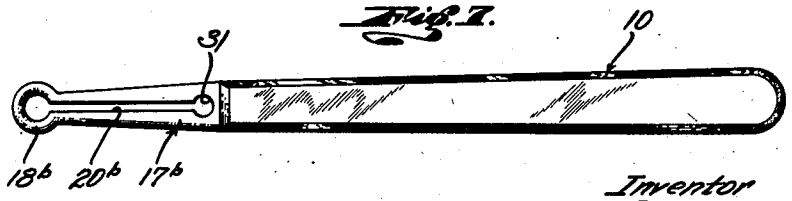


Fig. 7.



Inventor
ADOLPH RICKENBACHER
By
His Attorney

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2,287,327

TOOTHBRUSH

Adolph Rickenbacher, Los Angeles, Calif.

Application November 12, 1940, Serial No. 365,164

10 Claims. (Cl. 15—176)

This invention relates to tooth brushes and relates more particularly to the class of tooth brushes embodying adjustable and replaceable brush members or brush heads. A general object of this invention is to provide a tooth brush of the class referred to embodying simple, practical and very effective means for adjustably and removably mounting the brush head.

Tooth brushes have been introduced having removable brush heads supported for adjustment to selected angular positions with respect to the handle. The clamp means employed to mount the brush heads on the handles have been complicated and difficult to operate, usually embodying screw threaded parts which become rusted and clogged with dentifrice so that they can be operated only with great difficulty. Further, the prior brush head retaining means have extended a substantial distance along the handle and have been bulky so that they are liable to strike and injure the teeth, gums and lips.

Another object of this invention is to provide a tooth brush of the character referred to in which the means for removably and adjustably supporting the brush head is easily and quickly operated and does not embody screw threaded parts or the like liable to bind or freeze up.

Another object of this invention is to provide a tooth brush of the character referred to having a brush-head clamping and retaining means which is fully operated or controlled to grip and free the brush head by merely shifting a sliding member along a shank part of the handle.

Another object of this invention is to provide a tooth brush of the character mentioned in which the brush clamping and supporting means is compact, slender, short and without sharp corners and abrupt shoulders.

A further object of this invention is to provide a tooth brush of the class referred to in which the brush clamping means is very simple and inexpensive embodying but very few readily formed and assembled parts.

The various objects and features of my invention will be fully understood from the following detailed description of typical preferred forms and applications of the invention, throughout which description reference is made to the accompanying drawing, in which:

Fig. 1 is an elevation view of the back or upper side of one form of brush of the invention. Fig. 2 is a side elevation of the brush shown in Fig. 1. Fig. 3 is a fragmentary elevation view of the outer part of the brush shown in Fig. 1 with the brush head removed and illustrating the sliding member in cross section and in the releasing position. Figs. 4 and 5 are enlarged detailed cross sectional views taken as indicated by lines 4—4 and 5—5, respectively, on Fig. 3. Fig. 6 is a view similar to Fig. 1 illustrating another form of the invention and Fig. 7 is a view similar to Fig. 1 showing still another form of the invention.

The tooth brush of the invention illustrated in Figs. 1 to 5, inclusive, may be said to comprise, generally, a handle 10, a brush head 11, and means 12 on the handle 10 for removably and adjustably carrying the brush head 11.

The handle 10 is preferably an elongate member shaped and proportioned to be conveniently held and manipulated. In the particular case illustrated the handle 10 has substantially flat upper and lower surfaces, rounded edges, a curved outer end and a normal or substantially straight forward end. The handle 10 may be formed of any selected material such as a thermo-plastic material, Bakelite, ivory, bone, or the like. It will be observed that the handle 10 need not be of special formation to carry the means 12 or the brush head 11.

The brush member or brush head 11 includes a suitable rigid backing 13 in which the brush bristles 14 are set and a clip 15 secured on the backing 13. The clip 15 has an upstanding stud or stem 16. The stem 16 is round in transverse cross section and its periphery or outer surface may slope upwardly and outwardly to some extent. The clip 15 rounds or curves up to the base of the stem 16. The present invention is not primarily concerned with the brush head 11 per se and the brush head may be varied in construction without departing from the invention.

The means 12 is a feature of the invention and serves to mount the brush head 11 on the forward end of the handle 10 for ready adjustment to selected angular positions and for easy removal. The means 12 includes an elongate part extending forwardly from the handle 10 which I will term a shank member 17. The shank member 17 may be considerably thinner than the brush handle 10 and its side edges converge outwardly or forwardly so that the major portion of the member is considerably narrower than the handle 10. The member 17 is suitably fixed to the handle 10. In practice the inner or rear part of the member 17 may be cast or embedded directly in the material of the handle 10, although if desired, the member 17 may be pinned, riveted, cemented or screwed in the handle.

The outer or forward end of the member 17 is provided with an enlargement in the form of a

loop or eye 18. The opening 19 of the eye 18 is adapted to receive the stem 16 of the brush head 11. The wall of the eye 18 is substantially cylindrical in cross section, that is, the outer edges of the eye 18 are rounded off and the wall of the opening 19 is convex or rounded. With this formation the eye 18 conforms to and effectively engages about the stem 16 and is devoid of sharp edges and corners which might injure or irritate the mouth. The shank member 17 is formed of a flexible resilient material such as steel or other metal which possesses the required strength, although it is contemplated that the member 17 may be formed of a thermo-plastic material, or the like.

The shank member 17 is formed so that the eye 18 may be contracted and expanded at will to grip and free the brush stem 16. The member 17 is slotted to facilitate the expansion and contraction of the eye 18 being provided with a longitudinal elongate opening or slot 20. The slot 20 joins the opening 19 of the eye 18 and extends inwardly or rearwardly from the eye for a substantial distance. In practice the slot 20 may extend rearwardly to immediately adjacent the forward end of the handle 10. The portion of the slot 20 which merges with the eye opening 19 is preferably reduced in width so that it interrupts the eye 18 to a minimum extent. The slot 20 is of substantial width and its side walls converge outwardly or toward the eye 18. The shank member 17 having the slot 20 extending throughout the major or substantial portion of its length has two spaced side parts or arms 21 and 22 joined with the eye 18. One of these arms, say the arm 21, is cut through or interrupted to increase the flexibility of the eye 18. A transverse cut 23 is made in the arm 21 at a point adjacent to but spaced from the rear end of the slot 20. The cut 23 frees the inner end of the arm 21 from the inner part of the member 17 and leaves the arm as a projection or lever on the eye 18 which may be acted upon to expand and contract the eye. The cut 23 may be a narrow saw cut as illustrated.

The shank member 17 may be manufactured so that the lever arm 21 tends to spread or flare laterally through its inherent resiliency so that it would normally have its rear end out of alignment with its stub 21a or the member 17 may be constructed so that the arm 21 tends to remain aligned with its stub 21a, either of these formations being successful and operative. It is to be understood that the member 17 just described may be an integral or one-piece part, the arms 21 and 22, the eye 18 and the stub 21a being integrally joined.

The means 12 further includes a sliding unit or element for acting on the arms 21 and 22 to expand and contract the eye 18. This sliding element includes a clip or slide 24 shiftable along the member 17 and a wedge or block 25 carried by the slide 24 and operating in the slot 20. The slide 24 may be a sheet metal member shaped to engage about or surround the shank member 17 and is in the form of a ring which is flattened or made substantially rectangular to generally conform to the member 17. While the slide 24 generally conforms to the member 17 it has limited play or clearance to be readily shiftable. The slide 24 is constructed to have sufficient strength and rigidity to maintain its shape and to resist spreading and is formed with smooth surfaces and rounded corners and edges.

The wedge or block 25 is carried by or movable with the slide 24 and is within the slot 20. The block 25 may be a substantially square or rectangular member having smooth opposite sides for cooperating with the smooth convergent side walls of the slot 20. As best illustrated in Figs. 4 and 5 of the drawing the block 25 is arranged between the upper and lower parts of the slide 24 and the slide has inturned or downturned lugs 26 at the front and rear sides of the block. Thus the block 25 is confined by the slide 24 to move with the slide. The block 25 preferably has limited clearance or freedom in the slide 24 so that it may cooperate with the outwardly convergent walls of the slot 20 without binding, chattering or locking.

Upon outward movement of the slide 24 the block 25 cooperates with the convergent walls of the slot 20 to spread or expand the eye 18 and upon inward movement of the slide 24 this action is relieved and the eye 18 is compressed or constricted either by the automatic return of the arm 21 to a position in alignment with the stub 21a or by the action of the slide 24 on the convergent edges of the arms 21 and 22 or by both of these actions. The parts are formed and proportioned so that outward movement of the slide 24 to a position such as shown in Fig. 3 of the drawing expands the eye 18 to such an extent that the stem 16 is freed for ready removal or drops from the eye and so that rearward movement of the slide 24 to a position such as shown in Figs. 1 and 2 of the drawing compresses or contracts the eye 18 to such an extent that it firmly grips the brush stem 16.

The invention preferably includes means for releasably holding the slide 24 in the position where the eye 18 is tightly contracted on the brush stem 16. The outer edges of the arms 21 and 22 in the vicinity of the cut 23 are shaped to releasably retain the slide 24 in its fully retracted position so that it holds the eye 18 contracted. As illustrated in the drawing the arms 21 and 22 have flat substantially parallel surfaces 27 adjacent their inner ends for releasably retaining the slide 24, it being understood that these surfaces 27 may be made slightly convergent in a rearward direction if desired. It will be observed that when the slide 24 is engaged on the surfaces 27 that it covers and conceals the cut 23. Further, when the slide 24 is engaged on the surfaces 27 it lies immediately adjacent the end of the handle 10 leaving the arms 21 and 22 clear and the slide is protected by the end of the thicker handle 10 so that it is not liable to be accidently displaced.

It is believed that the operation of the brush shown in Figs. 1 to 5, inclusive, will be readily apparent from the foregoing detailed description. When the brush head 11 is to be installed the slide 24 is shifted outwardly on the member 17 to a position such as shown in Fig. 3. This results in expansion of the eye 18 and the brush stem 16 may be readily inserted in the eye. With the stem 16 engaged in the eye 18 the slide 24 is shifted rearwardly. Prior to or during this operation the brush head 11 may be set or adjusted in any selected angular position. The slide 24 is shifted rearwardly until it engages on the surfaces 27, which serve to releasably hold it in place. With the slide 24 engaged on the surfaces 27 the eye 18 is tightly contracted on the stem 16 to securely retain the brush head 11. It will be observed that the eye 18 substantially completely surrounds the stem 16 to have full bearing thereon when the eye is tightened. If, at any time during the use of the brush, it is desired to change the set-

ting or adjustment of the head 11 the head 11 is merely shifted or turned to the selected new position. There is sufficient resiliency and flexibility in the member 17 to allow the stem 16 to be turned in the eye 18 for such adjustment without necessitating movement of the slide 24. When the brush head 11 is to be replaced the slide 24 is shifted outwardly on the member 17 to expand the eye 18. This frees the stem 16 and permits easy removal of the brush head 11. A new or replacement brush head 11 may then be installed and the slide 24 returned to its position on the surfaces 27 to secure the new brush head in position.

Fig. 6 of the drawing illustrates a somewhat simplified form of the invention. In this construction the tooth brush comprises, generally, the handle 10, the brush head 11, both as described above, and means 12^a for adjustably and removably mounting the brush head 11 on the handle 10. The means 12^a includes a tapering shank member 17^a of substantially the same construction as the above described member 17. The member 17^a has an eye 18^a and an elongate slot 20^a which correspond to the above described eye 18 and slot 20, respectively. In this construction the inner part or rear part of the slot 20^a may be reduced in width. A lateral cut 23^a, corresponding to the above described cut 23, is provided in the arm 21^a of the member 17^a to render the member 17^a more flexible. The arm 21^a constitutes a lever projecting from the eye 18^a and normally tending to spread or flare laterally.

The means 12^a further includes a slide 24^a shiftable longitudinally on the member 17^a. The slide 24^a may be a simple ring-like member surrounding or engaged about the member 17^a. The slide 24^a may be generally rectangular to substantially conform to the member 17^a and has smooth rounded outer surfaces. The inner surfaces of the slide 24^a are preferably flat to ride on the surfaces of the member 17^a. Means is provided for releasably holding or latching the slide 24^a in the active position where it holds the eye 18^a contracted on the brush stem 16. A tapered or sloping surface 30 is provided on the rear corner of the arm 21^a at the cut 23^a to leave a depression or notch when the arm 21^a is forced to its retracted position. The slide 24^a engages with this surface 30 and is held thereby. When the slide 24^a is shifted rearwardly to engage with the surface 30 it covers and conceals the cut 23^a and retains the arm 21^a in the retracted position where the eye 18^a is tightly gripped about the stem 16. When the slide 24^a is shifted outwardly on the member 17^a the arm 21^a springs outwardly and the eye 18^a expands to loosen or release the brush stem 16.

The form of the invention illustrated in Fig. 7 of the drawing comprises the handle 10 and a member 17^b for mounting or supporting the brush head 11. The handle 10 may be as described above and the member 17^b may resemble generally the above described member 17. The member 17^b is provided at its outer end with an expansible and contractible eye 18^b and a longitudinal slot 20^b extends rearwardly in the member from the eye 18 to adjacent the end of the handle 10. An enlargement or opening 31 may be provided at the rear end of the slot 20^b. In this construction the arms or side parts of the member 17^b are uncut and are continuous. The eye 18^b is adapted to receive the brush stem 16. When the brush head 11 is to be installed a suitable tool or implement such as a screw driver, knife, or the like, is entered in the slot 20^b and is turned or manipulated to exert a spreading force on the arms or side parts of the member 17^b. This spreads or enlarges the eye 18^b and allows easy insertion of the stem 16. Upon withdrawal of the spreading tool the resiliency of the member 17^b causes the eye 18^b to tightly grip the brush stem 16. When the brush head 11 is to be adjusted or removed the spreading tool is again inserted in the slot 20^b and operated to spread or flex the side parts of the member 17^b to free the eye 18^b from the stem 16.

Having described typical preferred forms and applications of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend forwardly therefrom and provided at its forward end with an eye for receiving the stud, the member having forwardly convergent edges, and a sliding element movable along the member and cooperable with said edges to contract the eye onto the stud.

2. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member rigid with the handle body to extend forwardly therefrom and provided at its forward end with an eye for receiving the stud, the member having convergent longitudinal surfaces and having a longitudinal slot leading rearwardly from the eye to make the eye expansible and contractible, and a slide shiftable along the member and acting on said surfaces to cause contraction and allow expansion of the eye.

3. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend forwardly therefrom and provided at its forward end with an eye for receiving the stud, the member having forwardly converging edge surfaces and a longitudinal slot extending rearwardly from the eye which makes the eye expansible and contractible and which provides the member with spaced side arms, there being a cut through one of said arms joining the rear portion of the slot so that said arm forms a lever part on the eye, and a slide shiftable along the member to cooperate with said surfaces and to cause inward and outward movement of said arm and resultant expansion and contraction of the eye.

4. Handle means for a tooth brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend from the forward end thereof and provided at its forward end with an opening for receiving the stud, the member having forwardly convergent surfaces and having a slot extending rearwardly from the opening whereby the opening may be expanded and contracted, the slot dividing the member into two longitudinal arms, one of said arms having a transverse cut which joins the rear part of the slot and which frees said arm for inward and outward flexure to contract and expand the opening so that the stud may be gripped or freed at will, a manually movable element cooperating with said surfaces for producing said inward and outward flexing of

the arm, and means for releasably holding the element in the position where the stud is tightly gripped in the opening including surfaces on the member of different disposition than the first named surfaces and engageable by the element to retain the element in said position.

5. Handle means for a tooth brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend from the forward end thereof and provided at its forward end with an opening for receiving the stud and having a slot extending rearwardly from the opening whereby the opening may be expanded and contracted, the slot dividing the member into two longitudinal arms, one of said arms having a transverse cut which joins the rear part of the slot and which frees said arm for inward and outward flexure to contract and expand the opening so that the stud may be gripped or freed at will, a slide movable along the member and operable upon rearward movement to flex said arm inwardly, and a part movable with the slide and engaging in the slot to flex said arm outwardly upon forward movement of the slide.

6. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member rigid with the handle body and extending forwardly therefrom, the member having an eye in its outer end for receiving the stud and a slot extending rearwardly from the eye to render the eye expansible and contractible so that it adjustably and removably holds the stud, a slide shiftable along the member and operable by rearward movement to contract the eye, and a part on the slide engaging in the slot to expand the eye when the slide is shifted forwardly.

7. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member rigid with the handle body and extending forwardly therefrom, the member having an eye in its outer end for receiving the stud and a slot extending rearwardly from the eye to render the eye expansible and contractible so that it adjustably and removably holds the stud, the slot having forwardly convergent side walls, and a part movable in the slot and cooperable with said walls during forward movement to expand the eye.

8. A tooth brush handle means for a brush head having a mounting stud comprising a handle body, a member rigid with the handle body and extending forwardly therefrom, the member having an eye in its outer end for receiving the stud and a slot extending rearwardly from the eye to render the eye expansible and contractible so that it adjustably and removably holds the stud, the slot having forwardly convergent side walls, a part movable in the slot and cooperating with said walls during forward movement to expand the eye, and a slide carrying said part and shiftable along the member, the slide contracting the eye during its rearward movement.

9. Handle means for a tooth brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend from the forward end thereof and provided at its forward end with an opening for receiving the stud and having a slot extending rearwardly from the opening whereby the opening may be expanded and contracted, the slot dividing the member into two longitudinal arms, one of said arms having a transverse cut which joins the rear part of the slot and which frees said arm for inward and outward flexure to contract and expand the opening so that the stud may be gripped or freed at will, the slot having forwardly convergent walls and the member having forwardly convergent side surfaces, a part shiftable in the slot and engaging said walls during its forward movement to flex said arm outward and to expand the opening, and a slide shiftably engaged on the member and cooperating with said surfaces to flex said arm inwardly and contract said opening during its rearward movement.

10. Handle means for a tooth brush head having a mounting stud comprising a handle body, a member secured to the handle body to extend from the forward end thereof and provided at its forward end with an opening for receiving the stud and having a slot extending rearwardly from the opening whereby the opening may be expanded and contracted, the slot dividing the member into two longitudinal arms, one of said arms having a transverse cut which joins the rear part of the slot and which frees said arm for inward and outward flexure to contract and expand the opening so that the stud may be gripped or freed at will, the slot having forwardly convergent walls and the member having forwardly convergent side surfaces, a part shiftable in the slot and engaging said walls during its forward movement to flex said arm outward and to expand the opening, a slide shiftably engaged on the member and cooperating with said surfaces to flex said arm inwardly and contract said opening during its rearward movement, the slide carrying said part, and means for releasably holding the slide in a rearward position where the opening is contracted.

ADOLPH RICKENBACHER.