

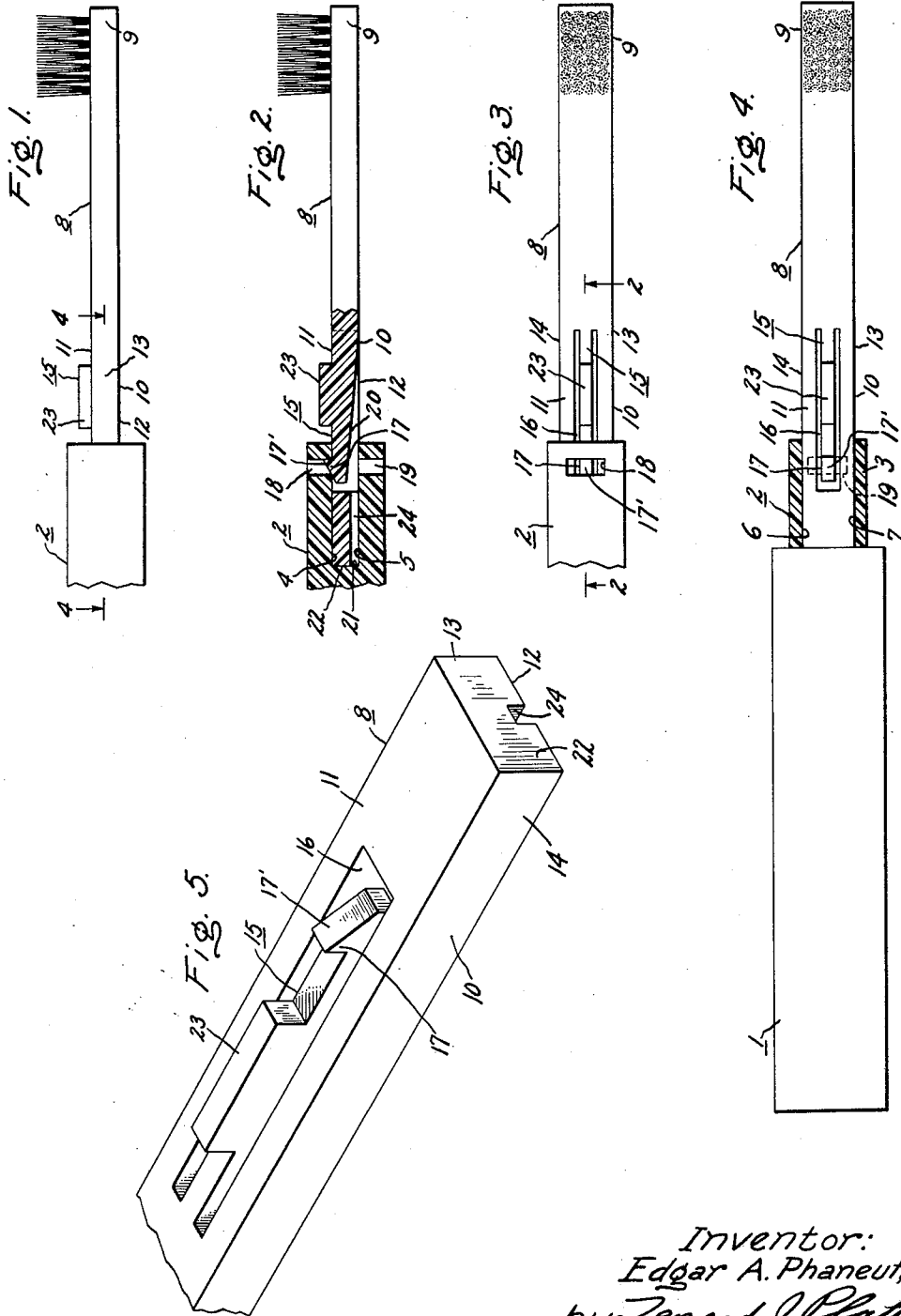
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POWER OPERATED TOOTHBRUSH

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POWER OPERATED TOOTHBRUSH

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

Personal power operated toothbrushes including a power unit and a toothbrush which may be removably secured to the power unit provide a very valuable addition to the dental hygiene art, but the extent of their use depends to a great degree on the ease with which the toothbrush may be removably secured to the power unit. It has been customary for a family to have a single toothbrush power unit with a plurality of interchangeable toothbrushes, one for each member of the family, including the children. Accordingly, a power operated toothbrush including a toothbrush which may be readily removed and inserted into the power unit, even by a child, is especially desirable.

Accordingly, it is a primary object of this invention to provide an improved arrangement for readily detachably securing a toothbrush to a toothbrush power unit.

It is another object of this invention to provide an improved toothbrush construction which is simple in structure and which may be easily manufactured.

In accordance with one aspect of this invention a socket for receiving a toothbrush is formed on the driven member of a toothbrush power unit. An enlarged opening is formed in the shank portion of the toothbrush and a unique resilient cantilever member is positioned within the enlarged opening. The cantilever member is formed integrally with the toothbrush shank and extends rearwardly. An upwardly extending inclined projection is integrally formed on the cantilever member for insertion within a transverse opening formed in the socket to thereby lock the toothbrush to the socket. By this construction, the toothbrush may be readily connected to the socket by simply pushing the toothbrush shank into the socket. During this movement, the inclined projection slides on an inner wall of the socket and when the projection registers with the transverse opening the projection is moved into the opening by the resilient force of the cantilever member. To remove the toothbrush, it is merely necessary to flex the resilient cantilever member and pull the toothbrush out of the socket.

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

FIG. 1 is a fragmentary side elevational view of a power operated toothbrush embodying the invention;

FIG. 2 is a partial cross-sectional view of the toothbrush taken in the plane represented by line 2-2 of FIG. 3;

FIG. 3 is a fragmentary plan view of the improved toothbrush shown in FIG. 1;

FIG. 4 is a partial cross-sectional view of the toothbrush shown in FIG. 1 taken in the plane represented by line 4-4 of FIG. 1; and

FIG. 5 is a partial perspective view showing the improved toothbrush.

Referring now to FIGS. 2 and 4, there is shown a power operated toothbrush comprising a power unit 1 for driving a power driven member 2 in a suitable manner. The power driven member 2 is preferably formed of molded plastic and a socket 3 having top, bottom and side walls 4, 5, 6 and 7, respectively, is integrally formed at the end of the power driven member 2 for receiving a toothbrush

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8. As shown, the toothbrush includes a forward bristle portion 9 and a rearward shank portion 10 for reception by the socket. The shank portion of the toothbrush is preferably formed of cellulose acetate butyrate, cellulose propionate or other suitable material.

A unique arrangement is provided for readily and conveniently detachably securing the toothbrush 8 to the power driven member 2. As shown more particularly in FIG. 5, the rearward shank portion of the toothbrush is shaped generally complementary to the socket member 3 and includes top, bottom and side surfaces 11, 12, 13 and 14. As shown, the top and bottom surfaces are substantially wider than the side surfaces 13 and 14 to permit the toothbrush shank to be inserted into the socket in either one of two logical simple ways, i.e., with the top surface 11 of the toothbrush shank in contact with the top wall 4 of the socket, or with the top surface 11 of the toothbrush in contact with the bottom wall 5 of the socket. Thus, if a child is old enough to be able to brush his teeth by hand, he would have no difficulty in inserting the toothbrush 8 into socket 2.

A resilient cantilever member 15 is provided for holding the toothbrush in the socket 3 when it is inserted therein. As shown, an enlarged opening 16 is formed in the shank portion of the toothbrush and the cantilever member 15 extends rearwardly from the forward portion of the opening. An upwardly extending projection 17 is formed at the end of the resilient cantilever member for insertion within one or the other of openings 18 and 19 which may be formed in the top and bottom walls 4 and 5, respectively, of the socket. As shown more particularly in FIG. 2, the openings 18 and 19 extend completely through the walls of the socket, however, it should be understood that they could extend only part way through the walls without departing from the scope of this invention. Nevertheless, it is necessary that the openings 18 and 19 be of sufficient size for receiving projection 17.

The projection 17 is uniquely inclined and located with respect to the other portions of the toothbrush shank. As shown, it is located at the end and most resilient portion of the resilient cantilever member 15. In its normal position, the projection 17 extends above the top surface 11 of the toothbrush shank while the extreme rearward portion of its inclined top surface 17' extends below the plane of the top surface 11 of the toothbrush shank. With this construction, as the shank portion of the toothbrush is inserted within the socket the inclined upper surface 17' of projection 17 abuts and slides on an inner wall of the socket and the projection is moved downwardly against the resilient force of member 15.

As shown in FIG. 2, a stop surface 21 of the socket 3 is so located with respect to the transverse openings 18 and 19, and the projection 17 that when the end surface 22 of the toothbrush shank abuts the stop wall 21 of the socket the projection 17 will be in register with one of the openings 18 or 19 to permit the projection 17 to snap into the opening under the resilient force of member 15.

The cantilever member 15 is constructed to provide desired resiliency characteristics and to obviate any tendency for the resilient member 15 to fracture at the forward edge of opening 16. To achieve this, as shown more particularly in FIG. 2, the bottom surface 20 of the resilient member 15 is tapered rearwardly so that the thickness of the resilient member 15 is reduced as its distance from the forward portion of opening 16 increases.

As shown more particularly in FIG. 5, an upwardly extending button 23 is provided on the central upper portion of the resilient cantilever member 15 to release the projection 17 from its latched position. The upper surface of the button is uniquely located above the plane of the upper surface 11 of the toothbrush shank. With this

construction, a child who merely grips the rearward shank portion of the toothbrush with the intention of pulling the toothbrush out of the socket will automatically depress the button and release projection 17 from opening 18 or 19.

In order to permit ready insertion of the toothbrush shank into the socket, even when the socket may be filled with water or other foreign liquid material, a canal groove 24 is provided in one of the walls of the toothbrush shank. As shown in FIG. 2, this canal groove extends from the end wall 22 of the shank to the forward edge of opening 16. Thus, as the toothbrush shank is inserted into the socket any foreign material will be forced through the canal groove 24 into opening 16 and out of socket 3.

From the foregoing description it will be appreciated that the improved arrangement for detachably connecting a toothbrush to a power operated member is simple in structure and may be easily manufactured. The enlarged opening 16, resilient member 15, button 23, projection 17 and canal 24 may all be formed on a toothbrush shank in a single molding operation. Likewise, the socket member 3 including its bottom wall 21, top, bottom and side walls and openings 18 and 19 may be molded in one operation.

While there has been shown and described a particular embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications can be made therein without departing from the invention, and therefore, it is aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim is:

1. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having inner walls formed at one end of said member for receiving a toothbrush, a transverse opening formed in an inner wall of said socket, a toothbrush having a forward bristle portion and a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, an enlarged opening formed in the shank portion of said toothbrush, a resilient cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening and being integrally formed with the shank portion of said toothbrush, an upwardly extending inclined projection integrally formed on said resilient member for insertion within said transverse opening, the upper portion of said upwardly extending inclined projection being slidable on an inner wall of said socket as the shank portion of said toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within said transverse opening to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

2. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having inner walls formed at one end of said member for receiving a toothbrush, a transverse opening formed in an inner wall of said socket, a toothbrush having a forward bristle portion and a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, an enlarged opening formed in the shank portion of said toothbrush, a resilient cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening and being integrally formed with the shank portion of said toothbrush, an upwardly extending inclined projection integrally formed at the end of said resilient member for insertion within said transverse opening, the upper portion of said upwardly extending inclined projection being slidable on an inner wall of said socket as the shank portion of said tooth-

brush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within said transverse opening to securely hold said toothbrush within said socket, and an upwardly extending button integrally formed on the top of said resilient member for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

3. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having side, top and bottom walls formed at one end of said member for receiving a toothbrush, a transverse opening formed in one of the walls of said socket, a toothbrush having a forward bristle portion and a rearward shank portion for reception by said socket, said shank portion having top, bottom and side walls, an enlarged opening formed in said shank portion extending through said top and bottom walls, a resilient integrally formed cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening, an upwardly extending button integrally formed on the top of said resilient member for flexing said resilient member, an upwardly extending projection integrally formed at the end of said resilient member for insertion within said transverse opening to securely hold said toothbrush within said socket, and a canal groove formed in one of the walls of said toothbrush for permitting expulsion of any liquid material which may be located within said socket as the toothbrush shank is inserted within said socket.

4. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having side, top and bottom walls formed in one end of said member for receiving a toothbrush, the top and bottom walls being wider than said side walls, a first transverse opening formed in said top wall, a second transverse opening formed in said bottom wall, a toothbrush having a forward bristle portion and a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, a resilient cantilever member formed in the shank portion of said toothbrush, an upwardly extending projection integrally formed on said resilient member for insertion within one of said transverse openings, said projection being slidable on an inner wall of said socket as the shank portion of the toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within one of said transverse openings to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

5. A toothbrush comprising a rearward shank portion, said shank portion having top, bottom and side walls, an enlarged opening formed in said shank portion extending through said top and bottom walls, a resilient integrally formed cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening, the bottom surface of said cantilever member being tapered rearwardly so that its thickness is reduced as its distance from the forward portion of said opening increases, an upwardly extending projection integrally formed at the end of said resilient member, and means for moving said projection transversely against the force of said resilient member.

6. A toothbrush comprising a rearward shank portion, said shank portion having top, bottom and side walls, an enlarged opening formed in said shank portion extending through said top and bottom walls, a resilient integrally formed cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening, the

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bottom surface of said cantilever member being tapered rearwardly so that its thickness is reduced as its distance from the forward portion of said opening increases, an upwardly extending projection integrally formed at the end of said resilient member, means for moving said projection transversely against the force of said resilient member, and a groove formed in one of the walls of said toothbrush shank.

7. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having inner walls for receiving a toothbrush, a transverse opening formed in an inner wall of said socket, a toothbrush having a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, an enlarged opening formed in the shank portion of said toothbrush, a resilient cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening and being integrally formed with the shank portion of said toothbrush, an upwardly extending inclined projection integrally formed on said resilient member for insertion within said transverse opening, the upper portion of said upwardly extending inclined projection being slidable on an inner wall of said socket as the shank portion of said toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within said transverse opening to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

8. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having side, top and bottom walls formed in one end of said member for receiving a toothbrush, the top and bottom walls being wider than said side walls, a first transverse opening formed in said top wall, a second transverse opening formed in said bottom wall, a toothbrush having a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, a resilient cantilever member formed in the shank portion of said toothbrush, an upwardly extending projection integrally formed on said resilient member for insertion within one of said transverse openings, said projection being slidable on an inner wall of said socket as the shank portion of the toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within one of said transverse openings to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

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9. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having inner walls formed at one end of said member for receiving a toothbrush, a transverse opening formed in an inner wall of said socket, a toothbrush having a forward bristle portion and a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, a resilient cantilever member formed in the shank portion of said toothbrush, an upwardly extending projection integrally formed on said resilient member for insertion within said transverse opening, said projection being slidable on an inner wall of said socket as the shank portion of the toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within said transverse opening to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

10. A power operated toothbrush comprising: a member adapted to be driven from a source of power, a socket having inner walls formed at one end of said member for receiving a toothbrush, a transverse opening formed in an inner wall of said socket, a toothbrush having a forward bristle portion and a rearward shank portion shaped generally complementary to the inner walls of said socket for reception by said socket, an enlarged opening formed in the shank portion of said toothbrush, a resilient cantilever member positioned within said enlarged opening, said cantilever member extending rearwardly from the forward portion of said opening, an upwardly extending projection integrally formed on said resilient member for insertion within said transverse opening, the upper portion of said upwardly extending projection being slidable on an inner wall of said socket as the shank portion of said toothbrush is pushed into said socket, said resilient cantilever member being self-urged in a direction for inserting said projection within said transverse opening to securely hold said toothbrush within said socket, and means for removing said projection from said transverse opening against the force of said resilient cantilever member to permit removal of said toothbrush from said socket.

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