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3,082,457

SELF-ADAPTING TUFTS FOR BRUSHES

Filed May 26, 1961

Fig. 1

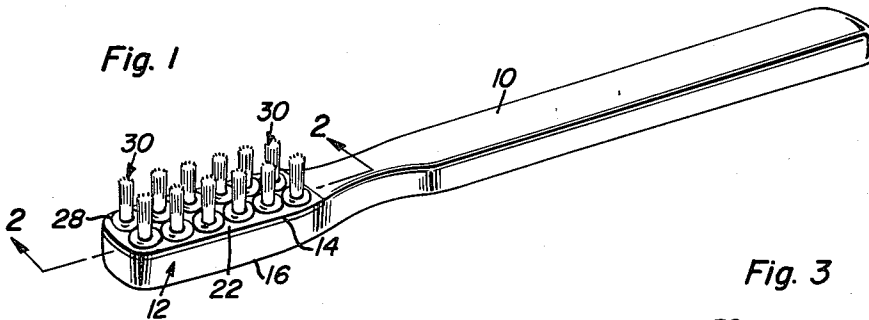


Fig. 2

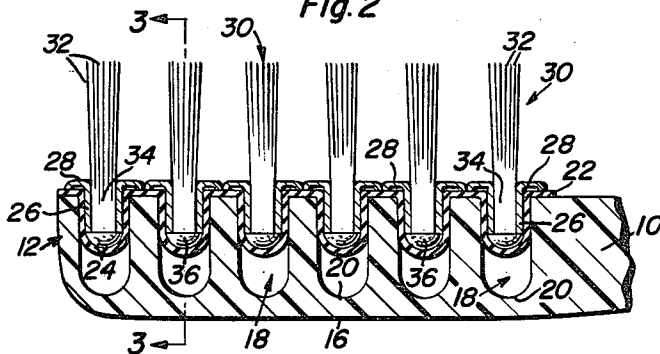


Fig. 4

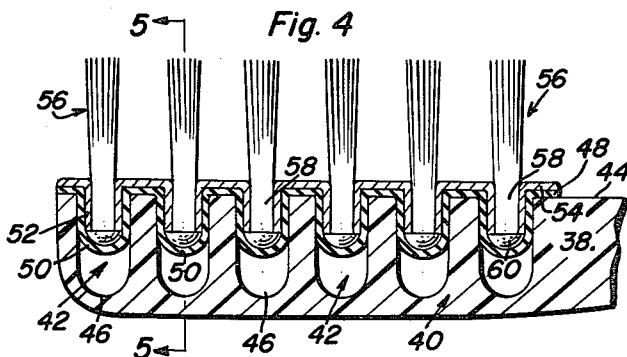


Fig. 3

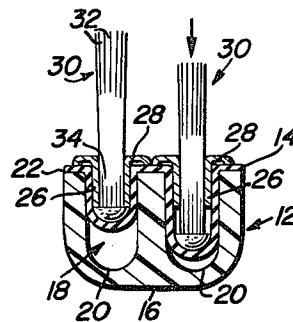


Fig. 5

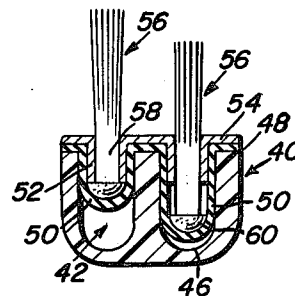
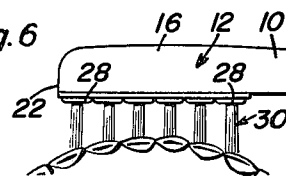


Fig. 6



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3,082,457

**SELF-ADAPTING TUFTS FOR BRUSHES**  
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This invention relates to a brush, more particularly, a toothbrush, and has to do with tufts of bristles and the manner in which said tufts are constructed and mounted on a conventional-type head and handle.

An object of the invention is to provide the brushing head with self-adapting tufts, that is, pressure-responsive tufts which, when the tips of the bristles of said tufts are pressed against the user's teeth, said tufts conform to and adapt themselves to the varying contours of the teeth and the intervening crevices between adjacent teeth, whereby to enable the user to brush and clean the contacted surfaces with certainty and requisite nicety.

The preceding generally stated objective is not in and of itself new as will be evident upon examining prior patents of Leira et al. 2,935,755 and Hadidian 2,882,544. It follows that a significant purpose of the present invention is to structurally, functionally and in other ways improve upon the stated patents. To the ends desired the invention offers members of the public a simple, practical and highly efficient toothbrush having certain new and useful improvements.

It will be evident as a result of a general survey of the views of the drawing that the overall inventive concept involves a plurality of species which will hereinafter be taken up and described in an orderly manner. Generically the concept comprehends a handle provided with a head, said head having at least one recess, a tuft having an end portion telescoping slidably into said recess, and means cooperable with said recess and said telescoping end portion and functioning to normally project the major usable part of the tuft beyond a working surface of said head but allowing said tuft to recede into the recess when pressure is intentionally applied to the tuft.

More specifically the invention pertains to a handle having a head provided with at least one socket with an end thereof opening through an obverse surface of said head, a tuft embodying bristles bunched together with the ends of the bristles at an inner end of the tuft bound together and providing a shouldered head, the latter portion of said tuft telescoping slidably into said socket, the major portion of said tuft projecting beyond said obverse surface, and means cooperable with said shouldered head and receptacle portion of said socket to normally project and maintain said major portion of the tuft in its ready-to-use position, said means being responsive to pressure transmitted thereto when the tuft is forcibly pressed into the socket.

Stated more explicitly the aforementioned means is characterized by a gum rubber diaphragm affixed to said obverse surface and having a molded nipple-like member projecting a limited distance into said socket with its bottom spaced from the bottom of said socket, a bushing fitted and telescoping into the receptacle portion of the nipple-like member and of a length less than the depth of said receptacle portion, the headed end portion of said tuft sliding through the bushing with the head operable in the space between the bottom of the nipple-like member and adjacent end of the bushing.

Then, too, novelty is predicated on a toothbrush characterized by a handle having a conventional-type elongated head at the usual operating end of the handle. This head, as is customary, has obverse and reverse elongated surfaces but in the instant adaptation the head is modified to provide therein a multiplicity of sockets with

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closed bottom portions and open end portions which open through the obverse surface. In one embodiment of this special adaptation the sheet of rubber is fitted on and fixed to and spans the obverse surface and this sheet in turn is provided with molded or preformed nipples which telescope partly into the respective sockets. Further, a sleeve is fitted in the open end portion of each nipple and serves as a bushing for the attachable and self-adjusting and adapting end portion of the associated tuft of bristles. This tuft in turn has a headed end portion slidably mounted in its particular bushing with the headed end seated in the cooperating closed end portion of the nipple. The inherent resilient properties of the nipple serve to present the tuft in its normal projecting ready-to-use position. When, however, the tips of the bristles of the tuft are pressed against a tooth surface the movable or reciprocable end of the tuft recedes into the socket a distance in proportion to the pressure exerted against the tuft as a unit.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawing forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view in perspective of a toothbrush constructed in accordance with the principles of the present invention and showing one embodiment or form thereof;

FIGURE 2 is an enlarged view in section and elevation taken on the plane of the section line 2—2 of FIGURE 1;

FIGURE 3 is a transverse or cross-section on the line 3—3 of FIGURE 2;

FIGURE 4 is a longitudinal sectional view corresponding to FIGURE 2 but showing a modification in the brush head construction;

FIGURE 5 is a section on the plane of the section line 5—5 of FIGURE 4;

FIGURE 6 is a view in elevation showing how the brush of FIGURE 1 is used in practice and illustrating the self-adapting and conformable feature of the invention.

With reference first to FIGURES 1 to 3 inclusive, the handle, which is usual, is denoted by the numeral 10 and the brush head at the outer end thereof is denoted generally by the numeral 12. This head as better shown in FIGURES 2 and 3 has a generally flat obverse surface 14 and a suitable reverse surface 16. This head is provided with a plurality of recesses each of which constitutes a socket 18, the closed bottom 20 being adjacent to the reverse side or surface 16. The open or mouth portion of the socket opens through the obverse surface 14. A sheet of suitable pure gum rubber or an equivalent material, denoted at 22, spans the surface 14 and is suitably attached thereto and is provided with preformed tuft supporting and adapting members. More specifically each member comprises a relatively short rubber nipple 24 which telescopes constantly into the cooperating socket. This is to say, each socket has a nipple projecting at all times therein. In addition a sleeve or bushing 26 is provided and this in turn telescopes into the neck of the receptacle portion of the nipple. The sleeve in this instance is carried by a grommet 28 which is appropriately retained in position in the manner illustrated in the views of the drawing. Each self-adapting tuft 30 is the same in construction and the bristles are denoted at 32. The back end portion of the tuft which is slidably and adjustably mounted is denoted at 34 and it is slidable through the bushing and terminates in an enlarged semi-spherical head 36 providing a limit stop or shoulder. The bristle ends are bunched and bonded together by the

head so that the thus headed tuft functions as an entity. The head 36 is conformably seated in the bottom of the nipple and operates toward and from the shoulder defined by the inner end portion of the sleeve or bushing 26. With this construction and arrangement it will be seen that when pressure is applied to the various tufts by engaging the bristles with the teeth in the manner illustrated in FIGURE 8, the tufts respond individually and adapt themselves conformingly to the ever-varying brushing and cleaning job to be accomplished.

The modification identified as FIGS. 4 and 5 is basically the same as that already described. Here again the handle 38 is provided with a head 40 having individual properly spaced sockets 42 opening through the obverse or working surface 44. The closed bottom of each socket is denoted at 46. The elastic or rubber sheet 48 spans the surface 44 and is fastened thereto and again is provided with elastic pressure responsive nipple-like members 50. In this arrangement the sleeves or bushings 52 are formed as depending necks on a single plastic or an equivalent plate 54 which is superimposed on the elastic sheet 48. This is accomplished in such a manner that each sleeve projects telescopically into its particular nipple. Again the tufts are as already described and each tuft is here denoted by the numeral 56, the neck or shank portion 58 extending slidably through the sleeve or bushing and terminating in a shouldered head 60 seated in the cooperating nipple. FIGURE 3 shows one tuft receding and under pressure as indicated by the arrow and the other one projecting to its normal position. The same result is depicted in FIGURE 5 and therefore the mode of operation of both embodiments, FIGURES 1 to 3, inclusive, on the one hand and FIGURES 4 to 5, inclusive, on the other hand should be clear.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A toothbrush comprising a rigid handle having a conventional-type elongated rigid head at one end of the handle, said head having elongated obverse and reverse substantially flat surfaces and being provided with a multiplicity of individual substantially parallel sockets with their axes at right angles to said surfaces, said sockets having closed bottom portions and open entrance portions, the latter opening through said obverse surface, a single sheet of rubber stretched flatwise over, fixed to said obverse surface and having a plurality of preformed extensible and retractible elastic nipples telescoping into and lining their respective sockets, the closed ends of said nipples being opposed to but spaced from the closed bottoms of said sockets, a sleeve fitted in a fluid-tight manner in the open end portion of each nipple and providing a bushing, and a tuft of bristles for each nipple-equipped socket, said tuft having a headed neck portion slidably mounted in the bushing provided therefor with the headed end snugly fitted and seated in the cooperating closed end portion of the nipple between said closed end portion and the cooperating end portion of said bushing, said head being normally pressed by the inherent resiliency of said nipple against the end portion of said bushing but being movable away from the latter when intended pressure is applied to the tip portion of said tuft, said sleeve being carried by a grommet encircling the bristles of the coating tuft, said grommet bearing against said sheet of rubber, said fixed sheet of rubber, the integral nipples thereon and the bushings telescoping into

said nipples serving to seal the headed ends of the tufts in the nipple-lined sockets.

2. A brush comprising a handle having a head provided with at least one socket closed at an inward end and having its outward end opening through an obverse surface of said head, a tuft embodying bristles bunched together with the ends of the bristles at an inner end of the tuft bound together and providing a shouldered head, the headed end portion of said tuft being of a cross-section slightly less than the cross-section of said socket and telescoping slidably into said socket, the major portion of said tuft projecting beyond said obverse surface, and means cooperable with said shouldered head and receptacle portion of said socket to normally project and maintain the major portion of the tuft in its ready-to-use position, said means being responsive to pressure transmitted thereto when the tuft is forcibly pressed and caused to recede into the socket, said means comprising a gum rubber diaphragm spread over, superimposed upon and affixed to said obverse surface and having at least one molded nipple substantially filling and projecting a limited distance into said socket with its bottom spaced from and movable toward and from the bottom of said socket, a bushing fitted in a fluid-tight manner and telescoping into the receptacle portion of the nipple and of a length less than the depth of said receptacle portion, the headed end portion of said tuft sliding through the bushing with the head operable in the space between the bottom of the nipple and adjacent end of the bushing.

3. A toothbrush comprising a rigid handle having a conventional-type elongated rigid head at one end of the handle, said head having elongated obverse and reverse substantially flat surfaces and being provided with a multiplicity of individual substantially parallel sockets with their axes at right angles to said surfaces, said sockets having closed bottom portions and open entrance portions, the latter opening through said obverse surface, a single sheet of rubber stretched flatwise over, fixed to said obverse surface and having a plurality of preformed extensible and retractible elastic nipples telescoping into and lining their respective sockets, the closed ends of said nipples being opposed to but spaced from the closed bottoms of said sockets, a sleeve fitted in a fluid-tight manner in the open end portion of each nipple and providing a bushing, and a tuft of bristles for each nipple-equipped socket, said tuft having a headed neck portion slidably mounted in the bushing provided therefor with the headed end snugly fitted and seated in the cooperating closed end portion of the nipple between said closed end portion and the cooperating end portion of said bushing, said head being normally pressed by the inherent resiliency of said nipple against the end portion of said bushing but being movable away from the latter when intended pressure is applied to the tip portion of said tuft, said sleeve being integral with and constituting a portion of a plate, said plate being superimposed upon and completely covering the aforementioned sheet of rubber, the integral nipples on said sheet of rubber and the bushings which telescope into the nipples serving to seal the headed ends of the tufts in said sockets.

4. A toothbrush wherein movably mounted self-adapting tufts are responsive to manually applied pressure comprising a head having an operating handle at one end of the head, said head having obverse and reverse surfaces which are approximately parallel with each other, the body portion of said head being provided with a multiplicity of individual substantially parallel sockets disposed in positions at right angles to the obverse and reverse surfaces of said head, each socket being closed at one end with the closed end terminating short of the reverse surface, the opposite end being open and opening through the obverse surface, an open-ended sleeve fixedly mounted on the obverse surface and tele-

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scoping into the open end portion of the socket with its outer peripheral surface spaced radially from the surface of the wall of the socket and providing a concentric bushing, an elastic nipple interposed between the bushing and wall of the socket and having an outer end connected in a fluid-tight manner with the obverse surface and having a closed bottom normally spaced from the closed bottom of said socket, said nipple being extensible and contractible within the confines of the socket when pressure is imposed thereon, and a tuft of bristles, said 10 tuft having a neck snugly but slidingly fitted in the bore of said bushing and being provided at a terminal end of the neck with a head and said head defining a stop

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shoulder, the shouldered head being interposed between the closed end of the nipple and adjacent end portion of the bushing, and said nipple being constantly under tension and serving to normally press the shoulder of the head against the end of the bushing.

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