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3,302,230

TOOTHBRUSH

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FIG.1

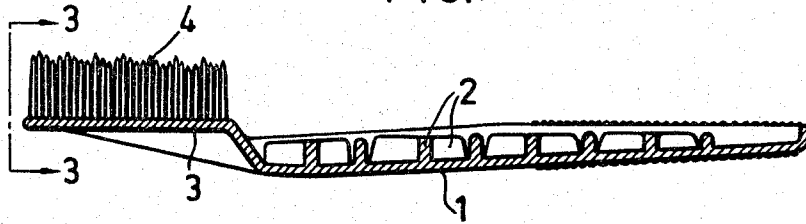


FIG.2

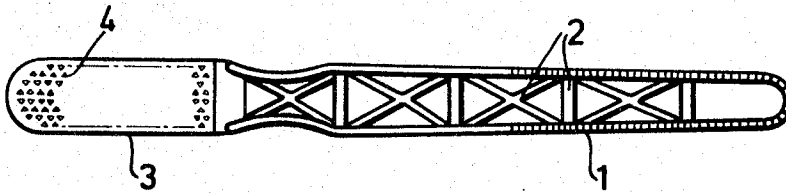


FIG.3

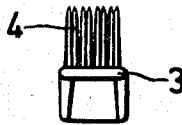


FIG.4



FIG.5



FIG.6



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3,302,230
TOOTHBRUSH

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13,124/64

2 Claims. (Cl. 15-167)

The present invention relates to a toothbrush made of a thermoplastic material, such as polyethylene or polypropylene and comprising a handle and bristles produced in one unit.

It is known that present day toothbrushes of the usual types to be found in shops, are almost without exception furnished with bristles of nylon and similar plastics. The material for bristles of such toothbrushes, is usually made of extruded nylon or some plastic which has similar physical qualities, and which material, at the production of the toothbrushes is cut into bristles of suitable length. In later years, however, one has noticed more and more, that bristles obtained by this method show great disadvantages on usage i.e. partly because such bristles have a detrimental effect or a tearing effect on the tissue of the gums, and partly because the plastic material employed, by virtue of its hardness, causes a heavy wearing or grinding effect, especially at the necks of the teeth, where the teeth are not coated with hard enamel. This disadvantageous grinding down of the surface material of the teeth and the detrimental effect on the tissue of the gums, has been established by a series of investigations.

Toothbrushes of polyethylene are also known, but the bristles of these must be made coarser than the bristles of conventional toothbrushes, because of technical reasons.

This has been considered to signify a disadvantage, inasmuch as these coarse bristles cannot clean effectively in small cavities or between teeth that are situated very closely to each other.

Therefore, for a great length of time a noticeable need has been present, in the field of odontology, for a toothbrush that is produced with a bristle material that has none of the said disadvantages.

These disadvantages can be eliminated by the toothbrush according to this invention, which because of its economical cost is, in addition, very suitable for disposable use e.g. in medical and dental services or at restaurants or hotels and when travelling.

The characterising features of the toothbrush according to the invention, is that its bristles taper or narrow toward the apices, preferably from the base to the apex, and have a cross-section in the shape of a polygon with at least two acute angles, and that the bristles have a coating of dentifrice. The cross-section of the bristles can be, therefore, triangular, rhombic, star shaped or form an irregular polygon, due to this shape of bristle a scraping effect is obtained, which is never achieved by a bristle of for instance circular cross-section, from which only a brushing effect is obtained. By the fact that the bristles narrow toward the apices, they are able to penetrate into the interdental spaces, which is not possible with the usage of the thick bristle hitherto existent e.g. of polyethylene.

Due to the special cross-section of the bristles, a better retention of the tooth cleaning medium is achieved than when bristles of circular cross-section are used.

Because of the relative softness of the bristles the toothbrush according to the invention is especially suitable for massage of the gums. It has proved especially suitable to use a thermoplastic material having a Shore

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C hardness of 75 to 94, preferably 85 to 87, determined according to DIN 53505.

The bristles can, to great advantage, on a toothbrush according to this invention, be produced of a thermoplastic material that is relatively soft, such as polyethylene of a density to within the range 0.917 to 0.940, especially 0.930-0.935, where the density is expressed in g./cm.³ and defined according to DIN 53749. The melting index of the polyethylene shall according to the invention, preferably lie within the range 1.5 to 1.7, especially 3.0 to 5 e.g. approximately 4, where the melting temperature range is expressed in g./10 min. and defined according to ASTM D 1238-57T.

The bristles can be given a relatively large cross-sectional area, which, however, as before mentioned, should decrease towards the apices, by which the bristles obtain the required mechanical qualities such as stiffness and flexibility.

It has been proved, that one obtains the best results when brushing the teeth, by the usage of bristles whose cross-section is comprised of a polygon with at least two acute angles and a cross-sectional area at the base of every bristle which lies within the range of from 0.10 to 0.30 mm.², preferably about 0.20 mm.². Thereby the longitudinal edges have a scraping effect on the coating on the teeth, which is efficaciously removed. It has proved to be especially suitable to provide the bristles in transverse rows with different lengths, whereby the least detrimental and the most effective cleaning of the teeth is achieved.

The toothbrush will be more clearly described, with reference to the annexed drawing in which: FIG. 1 shows a sectional elevation of a suitable embodiment of a toothbrush, which has been produced by injection moulding; FIG. 2 shows the bristles in a plan elevation; FIG. 3 shows the bristles in an end elevation along the lines 3-3 of FIG. 1, and FIGS. 4, 5 and 6 show, on a larger scale, a cross-section of a bristle.

In the embodiment shown in the drawing the toothbrush is provided with a handle 1, which has longitudinal and transverse strengthening ribs 2. The head of the toothbrush is indicated by 3 and its bristles by 4. In this embodiment, the bristles 4 have a triangular cross-section as is apparent from FIG. 2 and on a larger scale in FIG. 4.

Preferably, the bristles have such a cross-section as is shown in FIGS. 5 and 6. In FIG. 5 the cross-section is rhombic and in FIG. 6 star shaped.

The toothbrush is provided with a coating of tooth dentifrice, e.g. in the form of a layer on the bristles or in some other way by which the supply of special toothpaste becomes abundant when brushing the teeth.

The dentifrice can be comprised of a paste which slowly dissolves on contact with moisture, and preferably be situated between the separate bristles and most preferably in proximity to their union with the handle. This paste contains active detergents of the usual, existing types, e.g. sodium lauryl sulphate or sodium dodecyl benzene sulphonate, taste and smell substances and possibly other additive mediums usual to dental care preparations, such as mild grinding media or polishing media, tooth enamel strengthening additives and substances containing fluorides, etc., and as binding agent, a gelating substance that is slowly dissolved by moisture, such as vegetable gums, alginates or cellulose derivatives, e.g. carboxymethylcellulose. Thereby, a disposable toothbrush can be used several times, e.g. 3 to 10 times, without additional dentifrice being necessary. On renewed use a new quantity of dentifrice is dissolved by the moisture supplied.

The dentifrice may be coloured in order to make it easier to observe when it has been consumed.

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With such usage the coating of dentifrice is preferably provided with bactericides or fungicides of conventional type. By the addition of saliva secreting agents, e.g. in the form of an acid or an acidic salt, preferably vitamin C, the addition of water, when brushing the teeth, becomes unnecessary.

An example of a dentifrice in the form of a solution to be applied to the bristles and thereafter be allowed to dry is the following:

Sodium saccharine; saliva secreting agents, such as ascorbic acid, citric acid and monosodiumphosphate; ethyl alcohol; active detergents, such as sodium lauryl-sulphate; aromatic substances, such as *Gargarisma aromatica* conc. (containing i.a. peppermint oil and menthol); gelating substances, such as sodiungalgenate; grinding agents and distilled water.

The sodium saccharine and the saliva secreting agents can each be included in a quantity of about 20 percent by weight, the active detergent can be added in a quantity of about 10 percent by weight, and the distilled water is added up to 100 percent by weight.

What I claim is:

1. A toothbrush of thermoplastic material comprising a back having bristles in which the bristles taper toward the apices and have a cross section in the shape of a polygon with at least two acute angles and in which the bristles are provided with a coating of a dentifrice, each of said bristles tapering from the base to the apex, and the cross section at the base is approximately 0.2 mm.², each said bristle having a Shore C hardness of 85 to

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87 and a density of 0.930–0.935 where density is expressed in g./cm.³, and having a dentifrice containing a slowly dissolving gelatinous substance which dissolves upon contact with water, said dentifrice further containing a saliva secreting agent.

2. A toothbrush as claimed in claim 1 in which the coating of dentifrice contains as the saliva secreting agent, a compound selected from the group consisting of ascorbic acid, citric acid and monosodiumphosphate.

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