

Title: Toothbrush**Description****Technical field**

- 5 The invention relates to a manual toothbrush with an elongated handle part, which defines a geometric longitudinal axis, the handle part having a recess and a handle end face transverse to the longitudinal axis, and a method for producing a manual toothbrush.

State of the art

- Manual toothbrushes are available in a wide range of shapes and sizes. Whether a manual
10 toothbrush is popular with consumers and therefore successful depends on the cleaning effect (in particular the quality of the bristle field) on the one hand, and on the other hand on the ease of use and the aesthetic design.

- The production of manual toothbrushes is relatively undemanding. The effort required for a new toothbrush lies more in the development of a good design, in the selection of good materials and
15 in the right marketing. Because a toothbrush is repeatedly in contact with the body (saliva, teeth, gums), it is important that the quality of the materials is high.

- Manufacturers and distributors of high-quality toothbrushes are regularly confronted with copies. It is not uncommon for the difference between the original and the copy to be difficult to recognize. However, it is important for the manufacturer that his high-quality products are not
20 confused with products of dubious origin and quality.

Disclosure of the invention

The object of the invention is to create a manual toothbrush belonging to the technical field mentioned at the beginning, which has a permanent marking that is visible to the user but does not interfere with the user during normal handling of the toothbrush. In addition, the production of the toothbrush should not be affected by the type of marking.

- 5 The solution to the object is defined by the features of claim 1. According to the invention, the manual toothbrush has an elongated handle part, by which a geometric longitudinal axis of the handle part is defined, wherein the handle part has a recess and a handle part end side transverse to the longitudinal axis of the handle part, and a marking body is anchored in the handle part end side in a materially bonded manner that is undetachable by hand. A special type of
10 manually undetachable anchoring is a materially bonded anchoring.

The advantage of this solution is that the toothbrush has a three-dimensional marking or identification, but that this does not disturb the user in any way when holding the toothbrush in his hand. The marking body is anchored and therefore cannot be removed without destroying the product.

- 15 Another advantage is that the marking body is attached "in" and not "on" the end of the handle. The marking body is not in the form of a cap that grips the end of the handle from behind and from the outside.

- The marking body is materially bonded, i.e. no liquid can penetrate into the recess in the handle. This means that no bacteria can penetrate either, and the handle can be kept hygienically clean
20 without any problems during use. The material bond according to the invention can be achieved in different ways. For example, the marking body can fit snugly into the recess in the sense of a "press fit". It can also be fixed with an adhesive, for example. It is also possible to melt it on if the material of the marking body and the handle part are compatible..

- Depending on the design of the marking body, it is possible to clearly assign the toothbrush.
25 Because the user normally sees the brush as a whole when buying it, he can see the marking body if necessary and be sure that it is an original product.

A further solution to the object is a sealed sales packaging with a manual toothbrush, wherein the manual toothbrush comprises an elongated handle part, by which a geometric handle part longitudinal axis is defined. The handle part has a recess and a handle part end side, which is

transverse to the handle part longitudinal axis, in which a marking body is anchored in a manually undetachable manner.

A sealed sales package is defined as one in which the manual toothbrush (when it is in the sealed sales package) cannot be removed or the marking body manipulated without this being made apparent by damage to the packaging. The manual toothbrush is naturally placed in the sealed sales package before the manual toothbrush reaches the sales channels..

The sealed sales packaging preferably closes the toothbrush off from the environment in a hygienic manner. This is, for example, a completely closed, airtight plastic packaging. This can take the form of a blister pack or a self-supporting plastic packaging. A welded combination of plastic tray and cardboard cover is also possible.

Alternatively, the sealed sales packaging can have openings so that certain parts of the toothbrush are visible, allowing the customer to see the bristles, handle shape, color, etc. before buying the toothbrush.

According to a particular type of design, the base of the handle and the marking body are visible despite the sealed packaging. In this sense, the sealed packaging can be transparent at the base of the handle. Or an opening can be made in a non-transparent packaging through which the marking body is visible.

In a special embodiment, the marking body is an insert body that fits precisely into the recess when viewed in cross section perpendicular to the longitudinal axis of the handle. An insert body is characterized by the fact that it has a generally cylindrical surface and can therefore be (mechanically) inserted into a precisely shaped channel and held there. One advantage of this embodiment is that the marking body can be inserted into the end of the handle part very easily from a production point of view.

According to the mathematical definition, a generally cylindrical surface is created by shifting a plane curve c_0 , which is located in a plane E , along a straight line that is not located in the plane E by a fixed distance a_0 , and by connecting each two corresponding points of the original curve c_0 and the shifted curve c_1 by a line. The totality of these parallel lines forms the associated general cylindrical (surface) area-

The marking body can be short in the direction of the longitudinal axis of the handle (e.g. shorter than its maximum transverse dimension). However, it can also be advantageous if it is at least as large in the direction of the longitudinal axis of the handle as its maximum transverse dimension (measured perpendicular to the longitudinal axis of the handle).

- 5 The surface of the marking body is preferably designed so that the insertion is made in a straight line in the direction of the longitudinal axis of the handle.

It may be advantageous to provide a fine rib and a suitably arranged undercut (groove) on the generally cylindrical surface of the channel-shaped recess and/or on the generally cylindrical surface (contour) of the marking body. The dimension of the undercut or the rib in the direction
10 perpendicular to the longitudinal axis of the handle is in the order of magnitude of about 1/10 mm. This is therefore primarily a targeted unevenness and not an actual mechanical notch. This can improve the anchoring without substantially changing the character of the insertion.

However, as a variant, it is also conceivable that the marking body performs a small rotational movement (of a few degrees, for example) when inserted.

- 15 In one particular embodiment, the marking body is designed to contain an element that can be detected or read electronically. The element can be a simple digital circuit (e.g. an NFC chip) on which a code is stored. The code can be used by the manufacturer to make the toothbrush traceable (place of production, production batch, etc.).

However, it is not mandatory that the element is a digital circuit. Metal elements (e.g. copper
20 threads) can also be embedded, which can be identified with suitable detectors. The metal elements can, for example, be cast in the marking body in a special way (number, size, orientation, materialization), so that a characteristic signal is generated during analysis with a suitable measuring device, which serves as identification.

According to a particular embodiment, the marking body has a polygonal contour in a direction
25 transverse to the longitudinal axis of the handle. A simple quadrangle or square can be mentioned as an example. However, octagonal contours are also preferred, which result from the corners of a rectangle or square being cut off. A cross (dodecagonal) is also considered to be a preferred polygon. The advantage of polygons is that they are easy to handle from a production point of view.

In a particular embodiment, the contour of the handle and the marking body are geometrically similar. If the handle is an octagon transverse to its longitudinal axis, then the marking body also has an octagonal profile. If the recess also has an octagonal inner profile, the wall thickness of the handle part around the marking body can be made thin by choosing the size of the marking body appropriately.

A special embodiment of the invention is that the marking body forms a cross profile and the recess forms a cross profile channel that fits precisely with the cross profile.

The length of the recess is preferably at least several times the length of the marking body. This means that the handle is hollow over a longer distance. In particular, the recess in the handle can extend essentially to the bristle plate of the handle. This can save material if necessary.

However, it is also possible to fill the recess with a material that increases the weight of the toothbrush. For example, a metal rod can be inserted in the part of the recess of a plastic handle that is not occupied by the marking body. Because the marking body is anchored in the end face of the handle part in a materially bonded manner, no moisture can penetrate the recess and the metal rod cannot corrode.

If the metal rod is shorter than the length of the recess, the weight distribution of the toothbrush can be adjusted as desired by positioning the metal rod in the recess.

Preferably, the recess extends over a length that is at least half the length of the handle. If the marking body in such a case has a length that is no more than twice the transverse dimension, then the handle has a large interior or cavity, which is advantageous.

Protruding marking body: According to a particular embodiment of the invention, the marking body protrudes over the end face of the handle. This makes the marking body more easily recognizable. In addition, it can be felt and the user does not have to turn the brush over to check the marking body. It can also be easily detected with a light barrier. This makes it possible to apply a surface design (structure) that can be read by a light barrier at right angles to the longitudinal axis of the handle.

In an alternative embodiment, the marking body is recessed in the recess. This creates a kind of "negative" on the end face.

A further special embodiment of the invention is that the marking body is less extended transversely to the longitudinal axis of the handle part than the handle part. If the marking body is mushroom-shaped, for example, then the mushroom head is less extended transversely to the longitudinal side of the handle part than the end side of the handle part. The stem of the
5 mushroom shape is then, for example, shaped as an insert body.

In a special embodiment, the end of the handle is at an angle to the longitudinal axis of the handle. This means that the end of the handle is not at 90° to the longitudinal axis of the handle, but at 70°, for example. The marking body is preferably also at an angle to the longitudinal axis. This can be an advantage if the toothbrushes are sold in packaging that is opaque from below
10 and transparent only from the side. The marking body can still be recognized to a certain extent from the side due to the slanted end side.

According to a particular embodiment, the marking body is made of a different material than the handle. For example, the marking body is made of a softer material than the handle. In this case, the marking body fits into the recess like the plug of a wine bottle in the neck of the bottle.

15 The marking body can also be made of a harder material than the handle. If the handle is made of an opaque plastic, the marking body can be made of metal or glass, for example, or of a plastic that is harder than the material of the handle.

The handle can, for example, be made of an amorphous synthetic material (such as polyester, ABS, polycarbonate) and the marking body of a crystalline synthetic material (such as
20 polypropylene, polyethylene, polyoxymethylene). A special embodiment is when the handle is made of polymethyl methacrylate (PMMA), a special amorphous synthetic material, so that it is transparent.

In one particular embodiment of the invention, the handle is essentially rod-shaped. It is therefore essentially straight, with its cross-section preferably tapering successively from the
25 rear (handle end) to the front (brush head). This has the advantage that the wall thickness formed between the recess and the outside of the handle is uniform or changes only gradually. This is particularly advantageous if the handle is a synthetic material injection molded part. This makes it easy to produce and saves on material.

Preferably, the recess in the handle has a cross-section that tapers successively from the back (end of the handle) to the front (brush head). The cross-section is, for example, tapered linearly. This is advantageous from a production point of view (easy to produce).

5 A method for producing a manual toothbrush according to the invention has the following two steps:

1. The handle is produced with a recess using a (first) injection molding tool.
2. In a separate step, the prepared marking body is mechanically inserted into the recess.

The marking body is produced separately from the handle. Other materials can be used, which are produced using a different method. The two parts are joined together in a materially bonded
10 manner.

The following detailed description and the totality of the patent claims reveal further advantageous embodiments and combinations of features of the invention.

A brief description of the drawings

The drawings used to illustrate the example show:

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| 15 | Fig. 1 | a schematic representation of a manual toothbrush before the insertion of the marking body; |
| | Fig. 2a,b | a schematic representation of the section A-A through the rear end of the handle before and after the insertion of the marking body; |
| 20 | Fig. 3 | a schematic representation of a further embodiment with a cross-section-like marking body; |
| | Fig. 4 | a schematic representation of a longitudinal section through a manual toothbrush with a protruding marking body; |
| | Fig. 5 | a schematic cross-section through a marking body with a profile (structure) on the outer end face; |
| 25 | Fig. 6 | a schematic cross-section through a mushroom-shaped marking body. |

- Fig. 7 a cross-section of a manual toothbrush with a flush-mounted marking body and a short cavity;
- Fig. 8a, b a cross-section of a manual toothbrush with a flush-fitted hollow marking body and a long cavity;
- 5 Fig. 9a, b Examples of sealed packaging with manual toothbrushes with marking bodies;
- Fig. 10 a schematic representation of a blister pack.

In principle, the same parts are provided with the same reference signs in the figures.

Ways of carrying out the invention

- Fig. 1 shows a manual toothbrush 1 consisting of a rod-shaped handle 2, a tapering neck portion 3 and a bristle plate 4. The bristle tufts are inserted in the bristle plate 4 and project essentially perpendicular to the bristle plate 4. The neck portion 3 is the transition between the handle 2, which has a substantially constant cross-section, and the bristle plate 4. The neck portion 3 tapers successively from the handle 2 to the bristle plate 4. The handle 2, neck portion 3 and bristle plate 4 are a one-piece injection-molded part made of synthetic material.
- 10 Fig. 2a shows a longitudinal section through the handle portion 2 and the neck portion 3 of the toothbrush before the marking body 8 is inserted. As can be seen from Fig. 2a, the handle portion end side 5, which terminates the handle portion 2 transversely to the handle portion longitudinal axis 10, is located at the rear end of the handle portion 3. In the present example, the plane defined by the handle end face 5 is not perpendicular to the longitudinal axis 10 of the handle, but inclined at an angle w . The angle w shown in Fig. 2a is, for example, 70° - 80° .
- 15 20

A recess 7, which extends, for example, over the entire length of the handle 3, opens into the end face 5 of the handle. The handle 3 is therefore essentially tubular.

The inner surface 7 of the recess 6 in the area of the end face 5 of the handle part is essentially smooth and has the shape of a generally cylindrical hollow channel.

- 25 In the example shown, the marking body 8 has an octagonal contour 9. This means that in cross-section perpendicular to the longitudinal axis 10 of the handle part, the marking body 8 is octagonal. In this case, the outer surface of the marking body is an octagonal cylinder.

In a preferred embodiment, the outer end face 11 is inclined relative to the longitudinal axis 10 of the handle part in the same way as the end face 5 of the handle part. The inner end face 12, which is opposite the outer end face 11, is, for example, essentially parallel to the outer end face and thus also inclined relative to the longitudinal axis 10 of the handle part.

5 Fig. 2b shows a schematic view of the end of the handle part 2 with the marking body 8 inserted. The outer surface (contour 9) is precisely matched to the inner cross-section of the recess 6 on the end face 5 of the handle part. The marking body 8 can therefore be driven into the recess 6 by machine. The outer surface of the marking body 8 and the inner surface of the recess are then materially bonded to each other. The marking body 8 can no longer be removed
10 from the handle part by hand.

Fig. 2b shows the handle part 2 after the marking body 8 has been inserted. The end face 5 of the handle part is flush with the outer end face 11. The marking body 8 does not project beyond the end face 5 of the handle part. It can also be seen that the marking body 8 is "in" the end face 5 of the handle part. The marking body 8 is less extended transversely to the longitudinal axis of
15 the handle 10 (transverse dimension d in Fig. 2a) than the end face of the handle 5 (transverse dimension D in Fig. 2a)..

Figures 2a and 2b also illustrate the production process. First (Fig. 2a), handle part 2 (including neck portion 3 and bristle plate 4) and marking body 8 are produced separately (e.g. by injection molding). Then (Fig. 2b), the marking body 8 is inserted into the recess by machine. The
20 marking body 8 fits precisely into the recess in the handle part.

Fig. 3 shows an embodiment with a marking body 16 in the form of a cross profile. This is, for example, at least twice as long as its transverse dimension (perpendicular to the longitudinal axis of the handle). The recess 15 in the handle 13 opens out into the end face 14 of the handle. It is sufficient if only the opening area of the recess 15 forms a cross channel. In the area into
25 which the marking body 16 does not penetrate or advance, the recess can have an octagonal shape similar to the almond side of the handle part 13.

The marking body 16 is made of ceramic, for example. Alternatively, it can be made of stainless steel or a precious metal. A two-component synthetic material is preferably used.

Fig. 4 shows a longitudinal section through a manual toothbrush. The handle 17 is attached
30 directly to the bristle plate 18 and tapers linearly from back to front in cross-section. The recess

19 extends over the entire length of the handle 17. It has, for example, the shape of a steep-sided truncated cone or steep-sided truncated mathematical pyramid with an angle of 10° .

A metal rod 20 is inserted in the recess 19. This essentially fills the recess 19 up to the marking body 21. The latter protrudes with its outer end 22 by a projection V beyond the end face 23 of the handle part. The projection is e.g. 1 – 2 mm.

Preferably, the projection is less than half the length of the marking body 16.

The projection V should preferably not exceed a quarter of the maximum transverse dimension of the end face of the handle.

In the embodiment shown, the marking body 22 has a length that corresponds at least approximately to its largest transverse dimension (relative to the longitudinal axis of the handle). Preferably, the marking body 16 is at least twice as long as its largest transverse dimension.

Fig. 5 illustrates a particular embodiment of the invention by means of a longitudinal section through the rear end of the handle part 24 and the marking body 26. The marking body 26 has a characteristically profiled outer end face 27. The characteristic profile projects beyond the handle part end face 25 and can be used for identification by means of optical scanning.

Fig. 5 also illustrates the embodiment in which the recess 29 in the handle 24 is shorter than the marking body 26 (relative to the longitudinal axis of the handle). In this embodiment, the marking body 26 completely fills the recess and also projects beyond the end face 25 of the handle.

Fig. 5 also shows a schematic of an NFC chip 28 embedded in the marking body 26. This can be read out using an NFC reader (not shown). In this way, production-related information can be stored in the manual toothbrush.

Fig. 6 illustrates a marking body 30 in the form of a mushroom, for example. It should be mentioned that the head with its outer end face 31 (viewed transversely to the longitudinal axis of the handle part) is less extended than the end face 32 of the handle part. The stem of the mushroom shape is formed as an insert body (with a generally cylindrical surface). According to a particular embodiment of the invention, the marking body 30 projects beyond the handle end face 32 (in the direction of the longitudinal axis of the handle).

Fig. 7 shows an embodiment in which the channel-shaped recess 33 has a length L that is significantly shorter than the length of the handle part measured from the foot end (A) to the neck transition (B); for example, the length L is approx. $2/3 - 3/4$ of the length of the handle part. This width allows sufficient stability of the handle part while at the same time saving material. The transition (B) can be recognized from the outside, for example, by the fact that the cross-section begins to taper significantly. The marking body 34 is inserted with a clamp fit in the end of the recess 33. Its outer end is flush with the foot end of the handle, which is at an angle to the longitudinal axis of the handle.

Fig. 8a shows an embodiment in which the channel-shaped recess 35 has a length L that is significantly longer than the length of the handle portion measured from the foot end (A) to the neck transition (B). The recess 35 thus extends into the neck portion 37, being more conical in the neck portion 37 than in the handle portion. The neck portion 37 extends to a kink angle (C) at the transition between the neck portion and the brush head. The greater length of the recess makes it possible to optimize the weight distribution of the toothbrush if necessary. In particular, the recess can be filled area-wise with a material that has a greater density than the handle portion.

Fig. 8b shows an enlarged section of the rear end of the handle. In the mouth area 38, the free cross-section of the recess is larger than in the adjacent inner area of the recess 35. This creates a shoulder 39 that serves as a stop for the marking body 36. The length of the mouth area 38 therefore corresponds to the length of the marking body 36. This means that the marking body 36 sits in the recess with its outer end flush with the foot end of the handle part.

Fig. 9a shows a sealed package with a manual toothbrush with a marking body. The manual toothbrush 39 can, for example, be designed as in one of the embodiments described above. According to Fig. 9a, it is accommodated in a sealed package consisting of a cardboard cover in the form of a cardboard sheet 41 and a transparent plastic shell 40. The plastic shell 40 is, for example, dimensionally stable and forms the cavity necessary to accommodate the manual toothbrush 39. According to a preferred embodiment, the packaging is sealed in such a way that the contents are essentially packaged in an airtight manner. This has the advantage that the toothbrush is not only protected from unwanted manipulation of the marking body, but also remains hygienic until the packaging is opened.

Fig. 9b shows an embodiment in which several toothbrushes 42 are accommodated in a common sealed package 43. The package may be made of cardboard. In the area of the foot end of the toothbrushes 42, the package 43, which is not transparent in itself, has openings 44 through which the marking body is visible from the outside. The cover 43.1 is formed, for example, by a sheet of cardboard that is adhesively bonded to the rest of the packaging.

Fig. 10 shows a hand toothbrush 45 according to the invention in a blister pack 46. The blister pack is formed by a flexible plastic foil that fits snugly around the hand toothbrush 45..

The options shown in Fig. 5 (dimension of the recess, profiled end face, NFC chip) can of course be used independently of each other. The recess in the handle part can also be designed to be just as large as the part of the marking body to be countersunk in the handle part, as shown in the examples in Figs. 1-4. This means that the handle part is without a cavity in the finished state. In the example shown in Fig. 4, the handle material would be present instead of the metal rod (solid body).

In modification to Fig. 2a, the inner surface 7 of the recess 6 in the area of the handle end face 5 can also comprise annular ribs in order to improve the material bond on the corresponding ring areas.

In the examples of the embodiments, the material bond between the marking body and the handle part is mainly provided on the generally cylindrical surface of the marking body. In the example of Fig. 5, however, the material bond (e.g. by gluing or welding) can also be provided on the inner end surface of the marking body.

In summary, it can be stated that the invention provides a simple toothbrush with a marking body that can be used for various purposes.

Claims

1. A manual toothbrush (1) with an elongated handle (2) defining a geometric longitudinal axis (10) of the handle, the handle (2) having a recess (6) and a handle end face (5) transverse to the longitudinal axis (10) of the handle, characterized in that a marking body (8) is anchored in the handle end face (5) in a non-detachable manner, in particular by material bonding.
2. A manual toothbrush according to claim 1, characterized in that the marking body (8) is an insert body which, when viewed in cross-section perpendicular to the longitudinal axis (10) of the handle part, fits snugly in the recess (6).
3. A manual toothbrush according to claim 1, characterized in that the marking body (26) contains an element (28) that can be detected or read out electronically.
4. Manual toothbrush according to claim 1, characterized in that the marking body (16) has a polygonal contour in a direction transverse to the longitudinal axis (10) of the handle part.
5. A manual toothbrush according to claim 1, characterized in that a length of the recess (L) is at least a multiple of a length of the marking body (8).
6. A manual toothbrush according to one of the preceding claims, characterized in that the recess (6) extends over a length (L) corresponding to at least half the length of the handle part (2).
7. A manual toothbrush according to one of the preceding claims, characterized in that the marking body (21) projects (V) beyond the end side (23) of the handle part.
8. A manual toothbrush according to one of the preceding claims, characterized in that the marking body (8) is less extended (d) transversely to the longitudinal axis (10) of the handle part (2, D) than the handle part (2, D).
9. Manual toothbrush according to one of the preceding claims, characterized in that the end side (5) of the handle part is at an angle (w) to the longitudinal axis (10) of the handle part.
10. A manual toothbrush according to one of the preceding claims, characterized in that the marking body (8) is made of a different material from the handle part (2).

11. Manual toothbrush according to one of the preceding claims, characterized in that the handle part (17) is essentially rod-shaped and preferably has a cross section that tapers successively from the back to the front.
- 5 12. A manual toothbrush according to one of the preceding claims, characterized in that the recess (19) in the handle part (17) has a cross-section that tapers successively from the back to the front.
- 10 13. A method for producing a manual toothbrush according to one of the preceding claims, characterized in that the handle part with a recess is produced with a first injection moulding tool and in a separate step the marking body is mechanically inserted into the recess.
14. A method according to claim 13, characterized in that the marking body is produced with a second injection moulding tool and that the marking body is then pushed into the recess of the handle part in a materially bonded manner.
15. Sealed sales packaging containing a manual toothbrush according to one of claims 1 to 12.