

Description

This invention relates to a toothbrush having a container for containing toothbrushing material in liquid or emulsion form.

Various toothbrushes which contain toothbrushing material in paste or emulsion form and feed the material onto their bristle-planted portions when they are used for teeth-brushing operations have been proposed previously. The toothbrushes described in Japanese Utility Model Publications 138966/1977 and 102374/1979, extrude the material contained in their handles by extrusion members, such as a piston, or other members. However, the operation for extruding the material is troublesome, and it is difficult to adjust the piston or other member so as to extrude a suitable amount of the material. In a toothbrush containing a tooth-brushing material extrusion mechanism in its handle, there is an imperfect seal between the interior of the handle and the bristle-planted portion such that material can flow back into the interior of the handle from the user's mouth during a teeth-brushing operation.

FR-A-2222050 discloses a toothbrush comprising a bristle-planted rod which is provided, at its head, with a great number of bristles and forms a handle in which a container for tooth-brushing material in liquid or emulsion form is housed. The tooth-brushing material in the container is fed to the bristle-planted surface of the head of the rod through a material feeding passage formed in the rod by the action of a piston member embedded in the mouth of the container.

US-A-3613698 discloses a dental hygiene unit including a toothbrush and a replaceable disposable container of paste dentifrice which are arranged within a compact case. A sliding action of the case end deposits a measured amount of the dentifrice upon the bristles of the toothbrush and simultaneously ejects the upper portion of the brush into the usable portion.

However, neither of these latter two specifications disclose a toothbrush which can deliver dentifrice to the head of the toothbrush by operating the toothbrush with only one hand.

DE-A-2630569 describes a toothbrush comprising a bristle-planted rod provided at its head with a great number of bristles, and a handle including a container for containing tooth-brushing material in liquid or emulsion form, a material feeding passage formed in the rod being detachably connected to the interior of the container such that the tooth-brushing material in the container can be fed to a bristle-planted surface of the head of the rod through said material feeding passage, the rod and the container being axially movable relative to one another but being prevented from relative rotational movement, and further comprising a pumping mechanism for sucking the tooth-brushing material from the container and feeding the sucked material to the bristle-planted surface of the rod through the material feeding passage formed in the rod, said pumping mechanism having elastic means for urging the

rod and the container away from each other such that the pumping mechanism is operated by relative axial movement of the rod and the container.

In the toothbrush described in this specification, the container is received in an extension of the rod and is axially reciprocable to dispense tooth-brushing material to the bristles. Movement of the container has to be effected by pushing its rear end and this is difficult when using only one hand. Furthermore, the passage which has to be provided to enable air from outside to enter the container to replace dispensed tooth-brushing material also enables dirty water and the like to enter the container and contaminate its contents.

It is an object of the invention to provide a toothbrush containing a tooth-brushing material which can be operated by one hand to feed tooth-brushing material to its bristle-planted surface and which also protects the tooth-brushing material against contamination.

According to the invention, a toothbrush as defined above is characterised in that the pumping mechanism is housed within a main body whose rear end is detachably connected to a mouth of the container forming part of the handle, the main body also having a forward bearing portion in which a root portion of the rod is axially slidable, in that relative rotational movement of the rod and container is prevented by way of an operational projection formed on a peripheral surface of the rod, the projection being slidably received in a slit extending axially in the bearing portion of said main body, said operational projection being arranged to form a pushing member to enable the rod to be pushed rearwardly, in that the pumping mechanism includes a suction chamber communicable with the material feeding passage and the interior of the container, and a sealing portion slidable on an inner peripheral surface of the suction chamber, and in that to keep the suction chamber airtight said sealing portion has a forwardly expanded slide portion and a rearwardly expanded slide portion for slidably contacting the inner peripheral surface of said suction chamber, and in that for keeping the interior of the container airtight, the container has a movable bottom body arranged to be advanced in accordance with the amount of tooth-brushing material which has been sucked from the container by the pumping mechanism.

The arrangement of the operational projection which forms the pushing member enables one hand operation of the tooth-brush. The tooth-brushing material is protected against contamination by the airtightness of the suction chamber and of the container.

Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:—

Fig. 1 is a perspective view of a first embodiment of a toothbrush of this invention;

Fig. 2 is a vertical sectional view of the toothbrush shown in Fig. 1;

Fig. 3 shows a view similar to that of Fig. 2

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showing a bristle-planted rod of the toothbrush pushed into a handle main body;

Fig. 4 shows a view similar to that of Fig. 3 when the bristle-planted rod has been returned after having been pushed into the handle;

Fig. 5 shows a view similar to that of Fig. 4 when the bristle-planted rod has again been pushed in to feed tooth-brushing material;

Fig. 6 shows a view similar to that of Fig. 5 when material has been sucked into a suction chamber;

Fig. 7 is a vertical sectional view of a further embodiment of a toothbrush of this invention;

Fig. 8 is a vertical sectional view of an embodiment of an operational pipe of a toothbrush of the invention;

Fig. 9 is a vertical sectional view of an assembly of a handle main body and a valve seat;

Fig. 10 is a side view of the valve seat of Fig. 9;

Fig. 11 is a partially broken side view of a tooth-brushing material container; and

Fig. 12 is an enlarged sectional view of a movable bottom body.

In Figs. 1 and 2, a toothbrush 1 of this invention comprises a handle 2 and a bristle-planted rod 3 inserted in the forward end of the handle 2 slidably axially thereof, the handle 2 housing a pumping mechanism 4 for feeding tooth-brushing material in liquid or emulsion form.

The handle 2 comprises a combination of a main body 5 and a tooth-brushing material container 6 for housing a tooth-brushing material 24, connected to the handle body 5. The container 6 has a male thread 6A provided in the projected peripheral surface of the forward end thereof, and the body 5 has a female thread 5A provided in the inside peripheral surface of the rear portion thereof. The body 5 and the container 6 are connected detachably to each other by the screw-engagement of the male thread 6A with the female thread 5A.

The bristle-planted rod 3 is formed at its head, in a flat shape of rectangular section like a common toothbrush. The bristles 7 are planted in a bristle-planted surface 3A of the head of the rod 3. The rod 3 has a tooth-brushing material passage 8 provided in the interior thereof from the rear end 3B to the bristle-planting surface 3A thereof. The passage 8 opens directly on the bristle-planting surface 3A or is in communication with the planting holes of the respective bristles 7 planted in the bristle-planted surface 3A so that the tooth-brushing material 24 can be exuded at the roots of the bristles 7.

The rod 3 is slidably inserted at the root portion 3B thereof into the bearing portion 9 of the body 5 so as to keep a sealing function between the root portion 3B and the inside peripheral surface of the bearing portion 9. The bearing portion 9 has a slit 10 extending axially in the peripheral surface of the bearing portion 9. An operational projection 11 is protruded from the outside peripheral surface of the root portion 3B of the rod 3. The projection 11 is engaged slidably with the slit 10 to prevent the rod 3 from rotating about its axis.

The pumping mechanism 4 has an operational pipe 12 which is slidably inserted, at its forward portion, into the root portion 3B of the rod 3. The operational pipe 12 is inserted, at its rear portion, in a bearing hole 13 formed in the bottom of the bearing portion 9 of the body 5. The mechanism 4 has further a valve portion 15 formed in a bell-shape at the rear end of the operational pipe 12. The valve portion 15 is slidably disposed in the body 5 in a close contact with the inside peripheral surface thereof, and a compression spring 17 for returning the rod 3 via the operational pipe 12 in their forward direction, interposed between the rear end of the operational pipe 12 and a valve seat member 16 screwed on the rear end of the body 5.

A forward valve body 19 and a rear valve body 20 both in the shape of a ball are disposed respectively in a larger-diameter portion 12A formed at the outer end of the operational rod 12 and at a larger-diameter portion 16A formed at the forward end of a suction hole 18 passing through the valve seat member 16. The forward valve body 19 disposed in the operational pipe 12 opens and closes the outer end of a conduit 12B in the pipe 12 thereby to communicate and uncommunicate the same with the passage 8. The forward valve body 19 is always urged rearward by a spring 22. The rear valve body 20 disposed in the valve seat member 16 opens and closes the suction hole 18 of the valve seat member 16. An airtight suction chamber 21 is defined in the main body 5. In the rear portion of the valve seat member 16 is provided a packing P for keeping an airtight contact between the front end of the container 6 and the rear end of the valve seat member 16.

The tooth-brushing material container 6 is jointed to the main body 5 by engaging the male thread 6A with the female thread 5A in the valve seat member 16 with the packing P compressed between the forward end of the container 6 and the end face of the valve seat member 16. This joint brings the suction hole 18 of the valve seat member 16 into communication with the opening 6C of the container 6. The container 6 is provided with a bottom with a piston-like movable bottom body 23 which is slidable axially in close contact with the inside peripheral surface of the container 6. The movable bottom body 23 is made of soft synthetic resin or others and has slide edges 23B and 23C which are expanded in a bell-shape respectively at the forward end and the rear end of a cylindrical portion 23A. The tight contact of the slide edges 23B and 23C with the inside peripheral wall of the container 6 ensures the airtightness so that an emulsified material or liquid material 24 filled in the container 6 may not leak therefrom.

At the forward end of the cylindrical portion 23A, there is provided a smaller-diameter cylindrical portion 23D which can be inserted in the projected smaller-diameter portion 6B of the mouth of the container 6 so that all material 24 can be completely consumed. In drawings ref-

reference numeral 25 indicates a ring for preventing the movable bottom body 23 from dropping off from the rear end of the container 6. The ring 25 is inserted into the peripheral surface of the opened rear end of the container 6. At the same time, the ring 25 functions as a reinforcement member for preventing the deformation of the container by outside forces in order to keep the close contact of the slide edges 23B and 23C with the inside of the container 6.

The operation of the toothbrush 1 will be explained with reference to Figs. 2 to 6.

The handle 2 is held in one hand in the state shown in Fig. 2. When the brush 1 is used, the bristle-planted rod 3 is pushed rearward or toward the container 6 by putting a thumb on the operational projection 11, by pushing the tip of the rod 3 with the other hand, or by pressing the tip of the rod 3 against something. The rear portion of the rod 3 is pushed into the handle 2 along the bearing portion 9 as shown in Fig. 3 with the operational pipe 12 being pushed to advance in the handle main body 5. At this time, the forward valve body 19 opens the conduit 12B and the rear valve body 20 closes the suction hole 18.

Then the rod 3 is freed from the push so as to cause the repulsive force of the compressed spring 17 to push back the rod 3 and the pipe 12 to their respective forward positions. At this time the pressure in the suction chamber 21 of the body 5 becomes negative, a tooth-brushing material 24 in the container 6 is sucked into the suction chamber 21 of the body 5 through the suction hole 18 of the valve seat member 16 (Fig. 4). This suction results in a negative pressure in the container 6 to cause the movable bottom body 23 to advance for a short distance in close contact with the inside peripheral wall of the container 6.

The rod 3 is again pushed rearward as described above. This time the forward valve body 19 opens the conduit 12B of the pipe 12 and the rear valve body 20 closes the suction hole 18 of the valve seat member 16. The tooth-brushing material sucked in the suction chamber 21 is fed into the conduit 12B of the pipe 12 and the tooth-brushing material passage 8 of the rod 3 (Fig. 5). Thereafter, the rod 3 is freed from the push, and the material 24 in the suction chamber 21 stops flowing forward and the material 24 in the container 6 is sucked from the container 6 into the suction chamber 21 of the body 5 (Fig. 6). Similarly as described above this suction causes the movable bottom body 23 in the container 6 to move forward in response to the sucked amount of the material 24.

When the toothbrush 1 is initially used, this operation is repeated two or three times to fill the body 5, the conduit 12B and the tooth-brushing material passage 8 with the material 24. After this, one push of the rod 3 feeds an amount of the material 24 suitable for one tooth brushing operation onto the bristle-planted surface 3A. Thus, the toothbrush 1 is ready for use. Individually if the amount of the material 24 fed onto the surface

3A is not enough, twice- or more than twice-pushes will be given.

When the tooth-brushing material 24 in the container 6 has run out, the container 6 is unscrewed from the valve seat member 16, a cap (not shown) screwed on a fresh container 6 at the male thread 6A thereof is disengaged, and the male thread 6A of the fresh container is engaged with the female thread 5A of the body 5. Then immediately the toothbrush 1 can be again used continuously. When the opening of the tooth-brushing material passage 8 opening on the bristle-planting surface 3A of the rod 3 may become dry during a continuous use, the whole bristles 7 may be covered with a cap 26 as shown by a phantom line in Fig. 2.

The forward and the rear valve bodies 19 and 20 are not limited to the ball valve but may have any other structure which carries out the same function as the ball valve.

As described above, the toothbrush 1 of this invention comprises the bristle-planted rod 3 having the operational projection 11, and by the rod being pushed toward the main body 5, it can feed a certain amount of the tooth-brushing material 24 onto the bristle-planted surface 3A. Advantageously this makes it possible to brush teeth with one touch of operation. Besides, since one push of the rod 3 feeds a predetermined amount of the material, its users do not need to pay attention to how much the material should be squeezed for one tooth-brushing operation as they do with the conventional tooth-brushing operation and wasteful use of excessive material can be avoided. Furthermore, the material 24 is fed by simply pushing the rod 3. Accordingly, even infants and children can use the toothbrush 1 easily. Additionally the tooth-brushing material container 6 is easily detached from the main body 5 and disposable, and economically the main body 5 of the toothbrush can be used for a long time.

Especially in the toothbrush 1 of this invention, the movable bottom body 23 moves forward in response to a decrease of the material 24 in the container 6 when the rod 3 is pushed rearward to feed the material 24 toward the rod 3. This perfectly prevents air from being sucked from the outside into the material 24 in the container 6. It is desirable in terms of hygiene that the material can be fed in a perfectly sealed condition. Among others, the toothbrush 1 of this invention comprises a small number of components and can be easily fabricated.

An alternative embodiment of a toothbrush of the invention is shown in Fig. 7. In this embodiment, a pumping mechanism 4C comprises an operational pipe 12D, the rear end of which is provided with a valve portion 15F slidably in close contact with the inside peripheral surface of the main body 5. The valve portion 15F has, as shown in Fig. 8, a slide portion 15C and a slide portion 15D expanded in a bell-shape respectively forward and rearward. A compression spring 41 is interposed between the rear end of the oper-

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ational pipe 12D and a valve seat member 40 jointed by being screwed, for example onto the rear end of the body 5. The compression spring 41 is for returning the rod 3 to their forward positions.

The forward ball-shaped valve body 19 and the rear ball-shaped valve body 20 are disposed respectively in the larger-diameter portion (valve chamber) 12A at the forward end of the operational pipe 12D and in the larger-diameter portion (valve chamber) 16A at the forward end of a suction hole 42 of the valve seat member 40. The forward valve body 19 in the operational pipe 12D opens and closes the conduit 12B of the operational pipe 12D thereby to bring the toothbrushing material passage 8 into and out of communication therewith. The rear valve body 20 in the valve seat member 40 opens and closes the suction hole 42 of the valve seat member 40. The airtight suction chamber 21 is formed in the body 5. The spring 22 of a weak urging force constantly urges the forward valve body 19 in the direction to close the conduit 12B so that the forward valve body 19 may not open even when the toothbrush 1 is tilted with the rod 3 positioned lower.

The valve seat member 40, whose vertical section and end surface are illustrated in Figs. 9 and 10, respectively, is in the form of a conical projection 43 which is decreasingly tapered toward the tip thereof. The conical projection 43 has, at its rear end, four slits 43A expanding radially from a suction hole 42 to form a sharp shape thereat. The conical projection 43 may be made of a different material from that of the forward portion of the valve seat member 40, and the shape of the conical projection 43 is not limited to the one shown in the embodiment.

As shown in Fig. 11, the tooth-brushing material container 6D has a mouth sealed with a diaphragm 44. As described above, when a female thread 6C in the forward end of the container 6A is engaged with a male thread 5C at the rear end of the main body 5, the conical projection 43 breaks the diaphragm 44 thereby to bring the suction hole 42 of the valve seat member 40 in communication with the interior of the container 6D. When the toothbrush is not in use, a suitable cup is screwed on the female thread 6C.

The bottom of the container 6D is provided with a piston-like movable bottom body 45 which is slidable axially in close contact with the inside peripheral surface of the container 6D. The movable bottom body 45 is made of soft synthetic resin or others and in the form illustrated in Figs. 7 and 12. The movable bottom body 45 has slide edges 45A, 45B which are expanded in a bell-shape at the axially forward and the axially rear ends thereof and are reduced in thickness at the tips thereof. The slide edges 45A, 45B contact closely with the inside peripheral surface of the container 6D thereby to retain the airtightness so that the material 24 in liquid or emulsion form in the container 6D may not leak.

The plate 45C of the movable bottom body 45 has a throughbore 45D for filling the material 24

into the container 6D therethrough, provided in the centre thereof. The projected portion 46A of a seal member 46 is inserted into the throughbore 45D to close it. The seal member 46 also serves as a reinforcement member which prevents the container 6D from being deformed under the influence of exterior forces so that the close contact may not be impaired between the slide edges 45A, 45B between the inside peripheral surface of the container 6D.

In this embodiment, while the container 6 is being screwed onto the main body 5, the sharp point of the projection 43 hits and breaks the diaphragm 44, and when the former is completely screwed on the latter, they are jointed in the condition shown in Fig. 7 with the interior of the former being in communication with the valve chamber 16A through the suction hole 42. The pumping mechanism 4C operates in the same manner as that of each of the embodiments described above. The material 24 sealed in the container 6D by the diaphragm 44 does not degrade. While the container 6D is being screwed onto the main body 5, the diaphragm 44 is automatically broken, communicating the interior of the body 5 with the container 6D. Consequently the material does not leak out of the container 6D while both are being connected, and both can be readily connected.

Claims

1. A toothbrush (1) comprising a bristle-planted rod (3) provided at its head with a great number of bristles (7), and a handle (2) including a container (6) for containing tooth-brushing material (24) in liquid or emulsion form, a material feeding passage (8) formed in the rod (3) being detachably connected to the interior of the container (6) such that the tooth-brushing material (24) in the container (6) can be fed to a bristle-planted surface (3A) of the head of the rod (3) through said material feeding passage (8), the rod (3) and the container (6) being axially movable relative to one another but being prevented from relative rotational movement, and further comprising a pumping mechanism (4, 4C) for sucking the tooth-brushing material (24) from the container (6) and feeding the sucked material (24) to the bristle-planted surface of the rod (3) through the material feeding passage (8) formed in the rod (3), said pumping mechanism (4, 4C) having elastic means (17, 41) for urging the rod (3) and the container (6) away from each other such that the pumping mechanism (4, 4C) is operated by relative axial movement of the rod and the container (6), characterised in that the pumping mechanism (4, 4C) is housed within a main body (5) whose rear end is detachably connected to a mouth (6C) of the container (6) forming part of the handle (2), the main body (5) also having a forward bearing portion (9) in which a root portion (3B) of the rod (3) is axially slidable, in that relative rotational movement of the rod and container is prevented by way of an operational projection (11) formed

ational pipe 12D and a valve seat member 40 jointed by being screwed, for example onto the rear end of the body 5. The compression spring 41 is for returning the rod 3 to their forward positions.

The forward ball-shaped valve body 19 and the rear ball-shaped valve body 20 are disposed respectively in the larger-diameter portion (valve chamber) 12A at the forward end of the operational pipe 12D and in the larger-diameter portion (valve chamber) 16A at the forward end of a suction hole 42 of the valve seat member 40. The forward valve body 19 in the operational pipe 12D opens and closes the conduit 12B of the operational pipe 12D thereby to bring the toothbrushing material passage 8 into and out of communication therewith. The rear valve body 20 in the valve seat member 40 opens and closes the suction hole 42 of the valve seat member 40. The airtight suction chamber 21 is formed in the body 5. The spring 22 of a weak urging force constantly urges the forward valve body 19 in the direction to close the conduit 12B so that the forward valve body 19 may not open even when the toothbrush 1 is tilted with the rod 3 positioned lower.

The valve seat member 40, whose vertical section and end surface are illustrated in Figs. 9 and 10, respectively, is in the form of a conical projection 43 which is decreasingly tapered toward the tip thereof. The conical projection 43 has, at its rear end, four slits 43A expanding radially from a suction hole 42 to form a sharp shape thereat. The conical projection 43 may be made of a different material from that of the forward portion of the valve seat member 40, and the shape of the conical projection 43 is not limited to the one shown in the embodiment.

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The bottom of the container 6D is provided with a piston-like movable bottom body 45 which is slidable axially in close contact with the inside peripheral surface of the container 6D. The movable bottom body 45 is made of soft synthetic resin or others and in the form illustrated in Figs. 7 and 12. The movable bottom body 45 has slide edges 45A, 45B which are expanded in a bell-shape at the axially forward and the axially rear ends thereof and are reduced in thickness at the tips thereof. The slide edges 45A, 45B contact closely with the inside peripheral surface of the container 6D thereby to retain the airtightness so that the material 24 in liquid or emulsion form in the container 6D may not leak.

The plate 45C of the movable bottom body 45 has a throughbore 45D for filling the material 24

into the container 6D therethrough, provided in the centre thereof. The projected portion 46A of a seal member 46 is inserted into the throughbore 45D to close it. The seal member 46 also serves as a reinforcement member which prevents the container 6D from being deformed under the influence of exterior forces so that the close contact may not be impaired between the slide edges 45A, 45B between the inside peripheral surface of the container 6D.

In this embodiment, while the container 6 is being screwed onto the main body 5, the sharp point of the projection 43 hits and breaks the diaphragm 44, and when the former is completely screwed on the latter, they are jointed in the condition shown in Fig. 7 with the interior of the former being in communication with the valve chamber 16A through the suction hole 42. The pumping mechanism 4C operates in the same manner as that of each of the embodiments described above. The material 24 sealed in the container 6D by the diaphragm 44 does not degrade. While the container 6D is being screwed onto the main body 5, the diaphragm 44 is automatically broken, communicating the interior of the body 5 with the container 6D. Consequently the material does not leak out of the container 6D while both are being connected, and both can be readily connected.

Claims

1. A toothbrush (1) comprising a bristle-planted rod (3) provided at its head with a great number of bristles (7), and a handle (2) including a container (6) for containing tooth-brushing material (24) in liquid or emulsion form, a material feeding passage (8) formed in the rod (3) being detachably connected to the interior of the container (6) such that the tooth-brushing material (24) in the container (6) can be fed to a bristle-planted surface (3A) of the head of the rod (3) through said material feeding passage (8), the rod (3) and the container (6) being axially movable relative to one another but being prevented from relative rotational movement, and further comprising a pumping mechanism (4, 4C) for sucking the tooth-brushing material (24) from the container (6) and feeding the sucked material (24) to the bristle-planted surface of the rod (3) through the material feeding passage (8) formed in the rod (3), said pumping mechanism (4, 4C) having elastic means (17, 41) for urging the rod (3) and the container (6) away from each other such that the pumping mechanism (4, 4C) is operated by relative axial movement of the rod and the container (6), characterised in that the pumping mechanism (4, 4C) is housed within a main body (5) whose rear end is detachably connected to a mouth (6C) of the container (6) forming part of the handle (2), the main body (5) also having a forward bearing portion (9) in which a root portion (3B) of the rod (3) is axially slidable, in that relative rotational movement of the rod and container is prevented by way of an operational projection (11) formed



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on a peripheral surface of the rod (3), the projection being slidably received in a slit (10) extending axially in the bearing portion (9) of said main body (5), said operational projection being arranged to form a pushing member to enable the rod to be pushed rearwardly, in that the pumping mechanism includes a suction chamber (21) communicable with the material feeding passage (8) and the interior of the container (6), and a sealing portion (15, 15F) slidable on an inner peripheral surface of the suction chamber (21), and in that to keep the suction chamber (21) airtight, said sealing portion (15, 15F) has a forwardly expanded slide portion (15C) and a rearwardly expanded slide portion (15D) for slidably contacting the inner peripheral surface of said suction chamber (21), and in that for keeping the interior of the container airtight, the container has a movable bottom body (23, 45) arranged to be advanced in accordance with the amount of tooth-brushing material (24) which has been sucked from the container by the pumping mechanism (4, 4C).

2. A toothbrush as claimed in claim 1, wherein the pumping mechanism (4, 4C) further comprises an operational pipe (12, 12D) slidably received in said forward bearing portion (9) of the main body (5), the forward end of the operational pipe (12, 12D) being connected to the root portion (3B) of the rod (3), said elastic means (17, 41) comprising a compression spring arranged to urge the operational pipe (12, 12D) and hence the rod (3) forwardly, wherein said suction chamber (21) is defined by a forward valve body (19) and a rear valve body (20) mounted in the main body (5), the forward valve body (19) bringing the material feeding passage (8) into and out of communication with the suction chamber (21) whilst the rear valve body (20) brings a suction hole (18, 42) which extends between the mouth of the container (6) and the suction chamber (21) into and out of communication with the suction chamber (21), and wherein said sealing portion (15, 15F) is formed at the rear end of the operational pipe (12, 12D).

3. A toothbrush as claimed in claim 2, wherein the mouth of the container (6) is closed with a diaphragm (44), the rear end of the main body (5) being closed with a valve seat member (40) for holding the rear valve body (20), the valve seat member (40) being provided with a relatively sharp projection (43) extending rearwardly for breaking the diaphragm (44) when the container (6) is connected to the main body (5) of the handle (2).

Patentansprüche

1. Zahnbürste (1) bestehend aus einer mit Borsten besetzten Stange (3), die an ihrem Kopfteil mit einer großen Zahl von Borsten (7) versehen ist, und aus einem Griff (2) mit einem Behälter (6) zur Aufnahme von Zahnputzmaterial (24) in flüssiger Form oder als Emulsion und einem in der Stange (3) ausgebildeten Material-Zuleitungskanal (8), welcher abnehmbar mit dem Inneren

des Behälters (6) dergestalt verbunden ist, daß das Zahnputzmaterial (24) im Behälter (6) durch den Material-Zuleitungskanal (8) zu einer mit Borsten besetzten Fläche (3A) am Kopfteil der Stange (3) geleitet werden kann, wobei die Stange (3) und der Behälter (6) im Verhältnis zueinander axial verschiebbar sind, aber an einer Verdrehung gegeneinander gehindert werden, sowie aus einer Pumpeinrichtung (4, 4C) zum Absaugen des Zahnputzmaterials (24) aus dem Behälter (6) und zum Zuleiten des abgesaugten Materials (24) zu der mit Borsten besetzten Fläche der Stange (3) durch den in der Stange (3) ausgebildeten Material-Zuleitungskanal (8), wobei die Pumpeinrichtung (4, 4C) eine elastische Einrichtung (17, 41) aufweist, welche die Stange (3) und den Behälter (6) voneinander wegdrückt, so daß die Pumpeinrichtung (4, 4C) durch die Axialbewegung der Stange und des Behälters (6) im Verhältnis zueinander betrieben wird, dadurch gekennzeichnet, daß die Pumpeinrichtung (4, 4C) innerhalb eines Pumpengehäuses (5) untergebracht ist, dessen hinteres Ende abnehmbar mit einer Öffnung (6C) des Behälters (6) verbunden ist, der einen Bestandteil des Griffs (2) bildet, wobei das Pumpengehäuse (5) auch einen vorderen Lagerungsteil (9) aufweist, in welchem ein Fußteil (3B) der Stange (3) axial verschiebbar ist, daß eine Verdrehung der Stange und des Behälters gegeneinander mittels eines an einer Umfangsfläche der Stange (3) ausgebildeten funktionellen Vorsprungs (11) verhindert ist, wobei der Vorsprung verschiebbar in einem Schlitz (10) aufgenommen ist, welcher axial im Lagerungsteil (9) des Pumpengehäuses (5) verläuft, und wobei der funktionelle Vorsprung derart angeordnet ist, daß er ein Schiebeorgan bildet, das ein Zurückschieben der Stange ermöglicht, daß die Pumpeinrichtung eine Saugkammer (21) enthält, welche mit dem Material-Zuleitungskanal (8) und dem Inneren des Behälters (6) verbindbar ist, sowie einen Dichtungsteil (15, 15F), der an einer inneren Umfangsfläche der Saugkammer (21) verschiebbar angeordnet ist, und daß zur hermetischen Abdichtung der Saugkammer (21) der Dichtungsteil (15, 15F) einen nach vorne vorstehenden Gleitteil (15C) und einen nach hinten vorstehenden Gleitteil (15D) zur gleitenden Berührung mit der inneren Umfangsfläche der Saugkammer (21) aufweist, und daß zur hermetischen Abdichtung des Behälter-Innenraums der Behälter einen verschiebbaren Bodenabschnitt (23, 45) enthält, welcher derart angeordnet ist, daß er je nach der durch die Pumpeinrichtung (4, 4C) aus dem Behälter abgesaugten Menge des Zahnputzmaterials (24) nachrückbar ist.

2. Zahnbürste nach Anspruch 1, dadurch gekennzeichnet, daß die Pumpeinrichtung (4, 4C) eine funktionelle Röhre (12, 12D) umfaßt, welche im vorderen Lagerungsteil (9) des Pumpengehäuses (5) verschiebbar aufgenommen ist, wobei das vordere Ende der funktionellen Röhre (12, 12D) mit dem Fußteil (3B) der Stange (3) verbunden ist und die elastische Einrichtung (17, 41)





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eine Druckfeder enthält, welche derart angeordnet ist, daß sie die funktionelle Röhre (12, 12D) und somit die Stange (3) nach vorne drückt, daß die Saugkammer (21) durch einen in das Pumpengehäuse (5) eingebauten vorderen Ventilkörper (19) und einen hinteren Ventilkörper (20) abgegrenzt ist, wobei der vordere Ventilkörper (19) den Material-Zuleitungskanal (8) mit der Saugkammer (21) in Verbindung bringt bzw. von ihr trennt, wogegen der hintere Ventilkörper (20) eine Saugöffnung (18, 42), welche zwischen der Öffnung des Behälters (6) und der Saugkammer (21) verläuft, in Verbindung mit der Saugkammer (21) bringt bzw. von ihr trennt, und daß der Dichtungsteil (15, 15F) am hinteren Ende der funktionellen Röhre (12, 12D) ausgebildet ist.

3. Zahnbürste nach Anspruch 2, dadurch gekennzeichnet, dass die Öffnung des Behälters (6) mittels eines Diaphragma (44) geschlossen ist, das hintere Ende des Pumpengehäuses (5) mittels eines Ventilsitzelement (40) dass den hinteren Ventilkörper (20) halt geschlossen ist, und das Ventilsitzelement (40) mit ein verhältnismässig scharfer nach hinten ausgedehnt Vorsprung (43) um das Diaphragma (44) wann der Behälter (6) mit das Pumpengehäuse verbunden ist zu bersten versehen ist.

Revendications

1. Brosse à dents (1) comprenant une tige (3) plantée de soies, pourvue, à sa tête, d'un grand nombre de soies (7), et un manche (2) comprenant un récipient (6) destiné à contenir une matière (24) de brossage des dents sous forme liquide ou d'émulsion, un passage (8) d'alimentation en matière formé dans la tige (3) étant raccordé de façon amovible à l'intérieur du récipient (6) afin que la matière (24) de brossage des dents se trouvant dans le récipient (6) puisse être amenée à une surface (3A) plantée de soies de la tête de la tige (3) par l'intermédiaire dudit passage (8) d'alimentation en matière, la tige (3) et le récipient (6) étant mobiles axialement l'un par rapport à l'autre, mais ne pouvant tourner l'un par rapport à l'autre, et comprenant en outre un mécanisme de pompage (4, 4C) destiné à aspirer la matière (24) de brossage des dents dans le récipient (6) et à amener la matière aspirée (24) vers la surface plantée de soies de la tige (3) par l'intermédiaire du passage (8) d'alimentation en matière formé dans la tige (3), ledit mécanisme de pompage (4, 4C) comportant des moyens élastiques (17, 41) destinés à rappeler la tige (3) et le récipient (6) à l'écart l'un de l'autre afin que le mécanisme de pompage (4, 4C) soit manoeuvré par un mouvement axial relatif de la tige (3) et du récipient (6), caractérisée en ce que le mécanisme de pompage (4, 4C) est logé dans un corps principal (5) dont l'extrémité arrière est reliée de façon amovible à une embouchure (6C) du récipient (6) faisant partie du manche (2), le corps principal (5) comportant également une partie avant (9) d'appui dans laquelle une partie de pied

(3B) de la tige (3) peut coulisser axialement, en ce qu'un mouvement relatif de rotation de la tige (3) et du récipient est empêché au moyen d'une saillie fonctionnelle (11) formée sur une surface périphérique de la tige (3), la saillie étant logée de façon coulissante dans une fente (10) s'étendant axialement dans la partie d'appui (9) dudit corps principal (5), ladite saillie fonctionnelle étant agencée de façon à former un élément de poussée permettant à la tige d'être poussée vers l'arrière, en ce que le mécanisme de pompage comprend une chambre (21) d'aspiration pouvant communiquer avec le passage (8) d'alimentation en matière et avec l'intérieur du récipient (6), et une partie (15, 15F) d'étanchéité pouvant coulisser sur une surface périphérique intérieure de la chambre d'aspiration (21), et en ce que, pour maintenir la chambre d'aspiration (21) étanche à l'air, ladite partie d'étanchéité (15, 15F) comporte une portion coulissante (15C) expansée vers l'avant et une portion coulissante (15D) expansée vers l'arrière afin d'établir un contact coulissant avec la surface périphérique intérieure de ladite chambre d'aspiration (21), et en ce que, pour maintenir l'intérieur du récipient étanche à l'air, le récipient comporte un corps de fond mobile (23, 45) agencé de façon à être avancé en fonction de la quantité de matière (24) de brossage des dents qui a été aspirée à partir du récipient par le mécanisme de pompage (4, 4C).

2. Brosse à dents selon la revendication 1, dans laquelle le mécanisme de pompage (4, 4C) comprend en outre un tube fonctionnel (12, 12D) logé de façon coulissante dans ladite partie avant d'appui (9) du corps principal (5), l'extrémité avant du tube fonctionnel (12, 12D) étant raccordée à la partie de pied (3B) de la tige (3), lesdits moyens élastiques (17, 41) comprenant un ressort de compression agencé pour repousser le tube fonctionnel (12, 12D) et donc la tige (3) vers l'avant, ladite chambre d'aspiration (21) étant définie par un corps de valve avant (19) et un corps de valve arrière (20) montés dans le corps principal (5), le corps de valve avant (19) mettant le passage (8) d'alimentation en matière en et hors communication avec la chambre d'aspiration (21), tandis que le corps de valve arrière (20) mettant un trou (18, 42) d'aspiration, qui s'étend entre l'embouchure du récipient (6) et la chambre (21) d'aspiration, en et hors communication avec la chambre d'aspiration (21), et ladite partie (15, 15F) d'étanchéité étant formée à l'extrémité arrière du tube fonctionnel (12, 12D).

3. Brosse à dents selon la revendication 2, dans laquelle l'embouchure du récipient (6) est fermée par un diaphragme (44), l'extrémité arrière du corps principal (5) étant fermée par un élément de siège de valve (40) destiné à maintenir le corps de valve arrière (20), l'élément de siège de valve (40) comportant une saillie relativement effilée (43) s'étendant vers l'arrière pour rompre le diaphragme (44) lorsque le récipient (6) est raccordé au corps principal (5) du manche (2).

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