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(56) Documents Cited
GB 2286767 A GB 2269090 A GB 1124223 A
US 5062728 A

(58) Field of Search
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ON-LINE DATABASE: WPI

(54) **Toothbrush with toothpaste dispenser**

(57) A toothbrush comprises a tubular toothpaste dispenser (5) positioned within the handle or the toothbrush. The neck (2) of the toothbrush comprises a restricted bore (8) arranged to pump toothpaste (14) from the dispenser in the handle to the toothbrush head (1), upon telescopic axial movement of the neck relative to the handle.

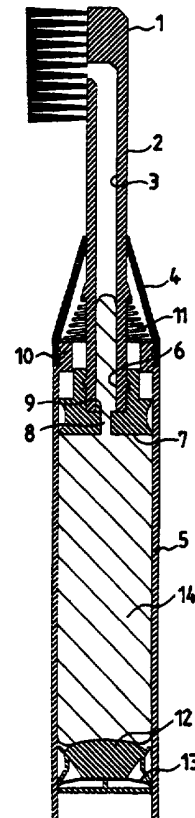


FIG. 2

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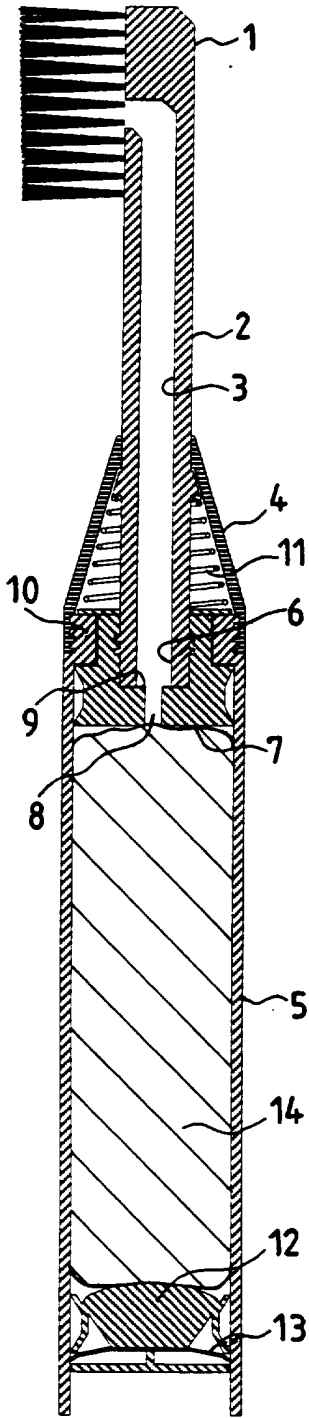


FIG. 1

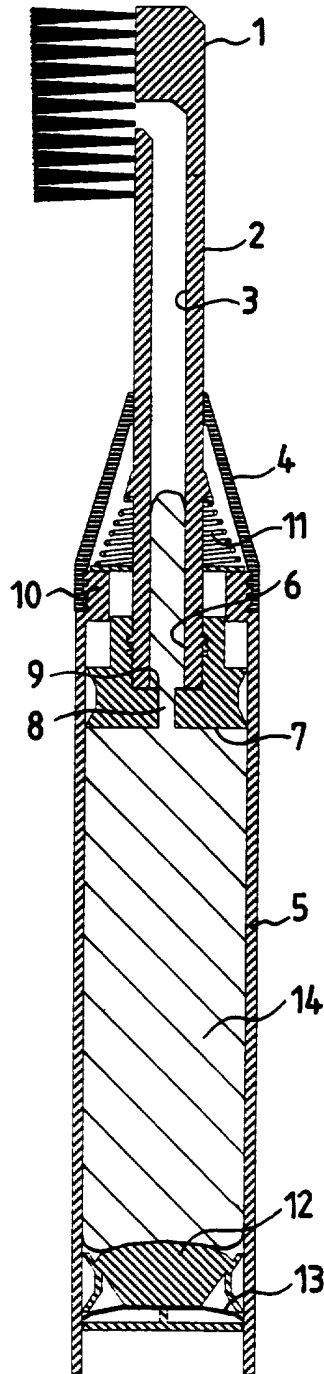


FIG. 2

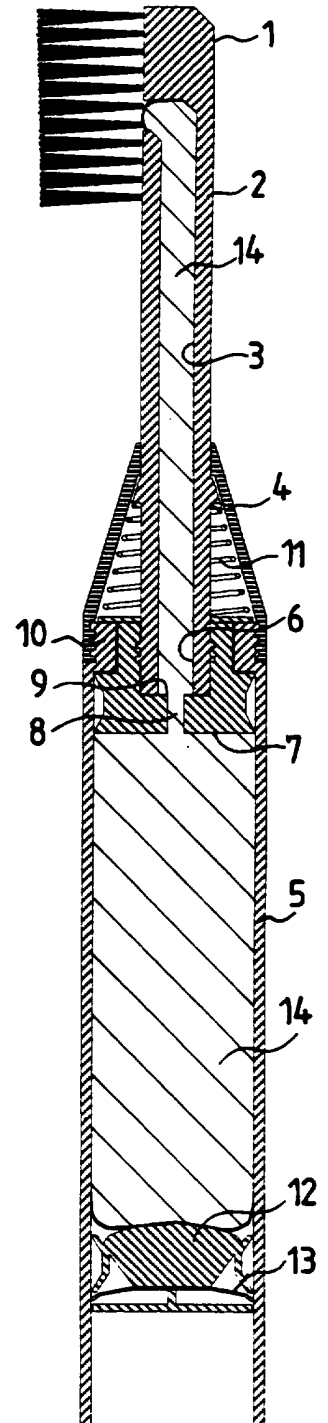


FIG. 3

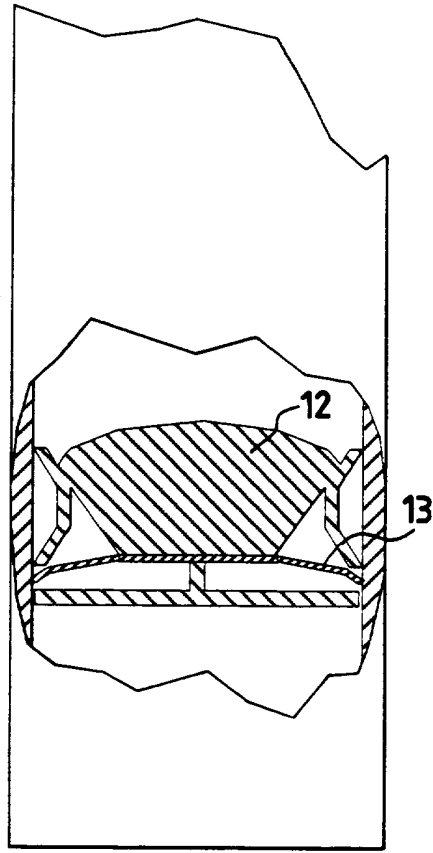


FIG.4

2302499TOOTHBRUSH WITH TOOTHPASTE DISPENSER

This invention concerns a toothbrush incorporating a toothpaste dispenser within its handle, in particular a toothbrush which dispenses the toothpaste directly into the head of the brush.

The concept of a toothpaste-dispensing toothbrush is well known. Such brushes are particularly useful for travellers. In the past, a wide variety of mechanisms have been proposed for conveying the toothpaste from the dispenser or container to the appropriate place among the bristles. A number of solutions to the problem involve complicated drive systems of the type used in grease guns and applicators for sealing compounds. WO93/17936 describes a toothbrush with a handle acting as a container and piston actioned dispenser with screw feed along a threaded shank, a regular feed length being achieved by the use of a double cam. WO93/03648 also involves the use of a threaded shank and a piston which is activated by turning the shank utilising one-way drive means. Other systems involve a drive piston which moved on a ratchet principle so that each push of the piston moves it forward irreversibly. Such systems are disclosed in EP 0 409 594A and 0 612 490A.

All of these systems involve relatively complicated engineering involving interacting parts which require precision manufacture and are therefore not cheap. A simpler system, relies on the principle of a conventional lift pump. The neck of the toothbrush slides telescopically with respect to the toothpaste dispenser so that an inwards movement squeezes some toothpaste out through a one-way valve into the neck of the brush and an outward movement causes the column of toothpaste in the dispenser to move up to replace the toothpaste dispensed.

We have now achieved an even simpler system which does not use any valve mechanisms, one-way drives or screw threads.

Thus, according to the present invention there is provided a toothbrush including a tubular toothpaste dispenser in the handle, the toothbrush comprising a brush head mounted on a hollow neck including a conduit for conducting toothpaste from the dispenser to the interior of the brush head characterised in that the neck joins the dispenser at a proximal end thereof, the neck and/or the proximal end including a restricted region upstream of a less restricted region, said restricted region permitting flow of toothpaste into the neck from the dispenser, the neck being mounted on the

dispenser to allow relative axial movement therebetween whereby toothpaste in the dispenser may be compressed and forced through said restricted region into said less restricted region, the dispenser being provided at a distal end with mobile stopper arranged for one-way sliding axial movement in the dispenser in the direction of the proximal end under the influence of the movement of toothpaste stored in the dispenser.

Preferably, the end of the neck remote from the brush head widens out into a piston arranged to fit the tubular dispenser barrel, this piston having located therein the restricted region, desirably aligned with the axis of the neck. A cylindrical bearing or journal is provided in the end of the tubular dispenser to permit the axial movement of the neck, the widened piston acting to "capture" the neck and retain it in the dispenser. The arrangement is preferably provided with biasing means, e.g. a helical spring, to return the neck to the basic position.

The mobile stopper in the distal end of the dispenser is, effectively, a free-floating piston of resilient plastic material shaped to form a slidable air-tight seal such that, when toothpaste is dispensed from the proximal end and the volume of the toothpaste column is reduced, the stopper is pushed by atmospheric pressure to remain in contact with the retreating face of the

toothpaste column. One-way movement is achieved by providing a radially extending resilient flange or several radially extending resilient barbs, arranged to contact the inner wall of the container at an angle, so as to move freely towards the brush end of the container but to lock against movement down the container.

The restricted region in the neck plunger can comprise a simple narrowing of the bore opening towards the brush into a relatively less restricted wider bore, preferably with a clear cut shoulder between the two.

Alternatively, the distal (downstream) end of the bore can be provided with some form of baffle arranged to cause restricted, indirect movement of the paste.

A preferred embodiment of the toothbrush according to the invention will now be described with reference to the accompanying drawings in which:

Figures 1 to 3 represent sectional front elevations; and

Figure 4 represents a detail of the floating stopper.

The toothbrush comprises a brush head 1 mounted on a tubular neck 2 having an inner bore 3, and located within a tapered portion 4 of a tubular toothpaste dispenser 5. The end 6 of the neck is fixedly mounted coaxially in a piston 7 incorporating a central restricted bore 8 of narrower diameter than the inner

bore 3 and separated from it by an abrupt shoulder 9. The piston 7 is mounted for axial movement in a cylindrical bearing 10 formed by a thickening of the wall of the dispenser 5. A bias spring 11 surrounds the neck 2 within the tapered portion 4.

The distal end of the tubular dispenser 5 contains a mobile stopper 12 having mounted thereon at its trailing edge a plurality of barbs 13 formed of resilient sheet material. Toothpaste 14 is stored between the piston 7 and the stopper 12.

In use, axial movement of the neck towards the dispenser 5 pressurises the contents of the dispenser. The pressure is resisted by the stopper 12 which is only capable of moving inwards by the gripping action of the barbs 13, and the pressure causes a supply of toothpaste to be squeezed through the restricted bore 8 into the inner bore 3 of the tubular neck 2. Return of the neck to its original position causes the column of toothpaste 14 within the dispenser to move upwards as shown in Figure 2, followed by the stopper 12 which remains in close contact. This action can be repeated until the toothpaste reaches the brush head 1 as shown in Figure 3.

CLAIMS

1. A toothbrush including a tubular toothpaste dispenser in the handle, the toothbrush comprising a brush head mounted on a hollow neck including a conduit for conducting toothpaste from the dispenser to the interior of the brush head characterised in that the neck joins the dispenser at a proximal end thereof, the neck and/or the proximal end including a restricted region upstream of a less restricted region, said restricted region permitting flow of toothpaste into the neck from the dispenser, the neck being mounted on the dispenser to allow relative axial movement therebetween whereby toothpaste in the dispenser may be compressed and forced through said restricted region into said less restricted region, the dispenser being provided at a distal end with mobile stopper arranged for one-way sliding axial movement in the dispenser in the direction of the proximal end under the influence of the movement of toothpaste stored in the dispenser.

2. A toothbrush according to Claim 1 in which the neck is widened within the dispenser in the form of a piston arranged for sliding movement within the tubular dispenser, the piston including the restricted region as a narrow bore.

3. A toothbrush according to Claim 1 or Claim 2, in which the mobile stopper comprises a trailing flange or barbs arranged for sliding movement towards the neck but locking any movement towards the distal end of the dispenser.

4. A toothbrush including a tubular toothpaste dispenser in the handle substantially as described herein with reference to the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.N) A4K (KBA)
- (ii) Int Cl (Ed.6) A46B 11/00, 11/02

Search Examiner
 Dr C L DAVIES

Date of completion of Search
 13 SEPTEMBER 1995

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
 1-4

(ii) ON-LINE DATABASE: WPI

Categories of documents

- X:** Document indicating lack of novelty or of inventive step.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.
- A:** Document indicating technological background and/or state of the art.
- P:** Document published on or after the declared priority date but before the filing date of the present application.
- E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- &:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2286767 A (HSIN-HAI LAN) see Figure 3	
A	GB 2269090 A (FIRTH) see Figures 5 and 6 and page 4 lines 16-20	
A	GB 1124223 (BIOFARMACOTER-APICO) see Figure 1	
A	US 5062728 (KUO) see Figures 8a-8e	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).