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(54) Title: TOOTHBRUSH WITH TOOTHPASTE CONTAINER AND DOSING TRIGGER

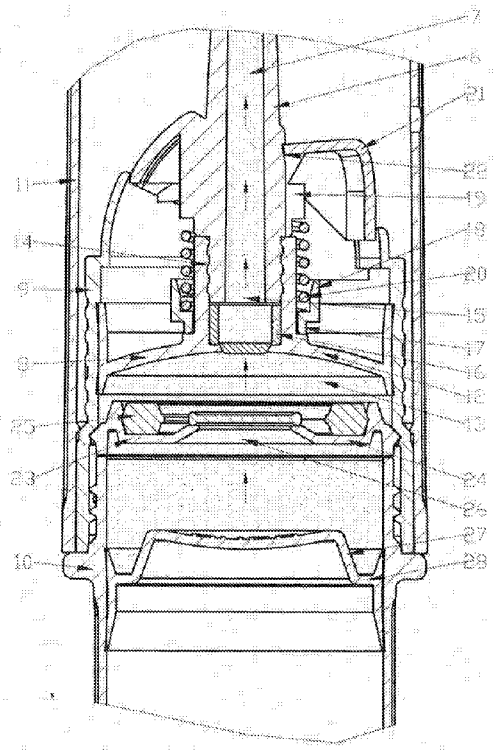

Fig.2

(57) Abstract: Toothbrush comprises head with bristles and slotted outlet opening gradually transforming into hollow tube for delivery of toothpaste onto cleaning surface of bristles. Toothbrush has dosing trigger (8) consisting of holder (9). Upper sleeve (12) is designed in form of pomp (13) rigidly connected to tube by screw thread (14). Tube rests upon valve (16) and has securing element (17) with lock (18) and ledge (19) holding spring (20). Button (21) is mounted on holder imparting tube reciprocating movement together with pomp along toothbrush. Lower sleeve (23) has valve (25). Toothbrush is convenient in use, it is especially suitable for tourists, military men and disabled people.

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TOOTHBRUSH WITH TOOTHPASTE CONTAINER AND DOSING TRIGGER

Field of the Invention

The invention relates to sanitary and hygienic accessories, namely toothbrushes.

Background of the Invention

There are known manually operated toothbrushes, for example, US patent No. 5,346,324 «Dentifrice dispensing toothbrush with replaceable cartridge», A46B11/02, 1994; GB patent No. 2 291 799 «Reservoir toothbrush», 1996, which utilize a compressible elastic button to pump toothpaste for teeth cleaning.

There are known also toothbrushes (for example, US patent No. 5,827,001, A45D40/00, 1998, US patent No. 6,179.503, A45D 40/00, 2001) with a toothpaste reservoir and a simple control delivering mechanism which is associated with an elastomeric valve system for dispensing an amount of oral hygienic paste onto bristles on the toothbrush.

The common disadvantage of known toothbrushes is their relatively complex design. Many delivering devices have such small opening that there is doubt whether toothpaste may be dispensed onto bristles, especially, when the opening for delivery of the toothpaste is defined alongside of a channel of a tube. Moreover, there is a risk that the toothpaste may clog at ball valves, and the toothpaste may be dispensed onto cleaning surface of a toothbrush when a button is pressed accidently.

It is the object of the invention to provide a compact toothbrush, which overcomes the aforesaid disadvantages, and which is easy to manufacture, convenient and reliable in use.

As regards to the design features and the method of the toothpaste dispensing onto the cleaning surface of bristles the closest is the known toothbrush with a toothpaste container and a dosing trigger (US patent No. 7,070,353, A46B11/00, 2005). The toothbrush comprises a head with bristles provided with an outlet opening and a hollow tube for dispensing of a toothpaste onto its cleaning surface from the container by means of a dosing trigger, which consists of a button with a spring interconnected with a valve, and is mounted in an upper intermediate chamber of the container communicating with the hollow tube and with the container having a piston and under-piston cavity open to an atmosphere. Moreover, the container is provided with a cover and may be made disposable, for which purpose the container and the tube – toothbrush handle are made as an integral whole. In another embodiment the container has two chambers, one of which is filled with the toothpaste, and another chamber contains a hollow tube, which is mounted in clamps with a possibility to extend into an operative position.

The disadvantage of the known toothbrush is that generally it has relatively complex design, and the operation of such toothbrush requires an activation of several different elements of a system and/or manipulation thereof, namely: manual extending of the toothbrush from the container and then pressing the button. Gates and ball valves make it unreliable for operation because there is a risk that misalignments and the toothpaste clogging at ball valves may occur.

Summary of the Invention

The technical result is to simplify a control of delivery mechanism and to increase the reliability.

Said technical result is achieved by that according to the present invention, there is provided a toothbrush with a toothpaste container, a piston and a dosing trigger, including a head with bristles provided with an outlet opening and a hollow tube for the delivery of a dose of the toothpaste from the container onto its cleaning surface by means of the trigger placed in an intermediate chamber connecting cavities of the container and the hollow tube, said toothbrush is provided with an adapting pipe which with its one end of the larger diameter fits into a container, and with its second end fits into a toothbrush cover, in which two sleeves with one-way valves are coaxially mounted, while the upper sleeve is designed in the form of a pomp rigidly connected to a hollow tube provided with a spring interacting with a drive button imparting the tube reciprocating movement along the toothbrush providing a sucking effect and filling the pomp cavity and the hollow tube with the toothpaste with the subsequent delivery of a dose of the toothpaste onto bristles, while

- the tube on its peripheral part is provided with a screw thread, onto which an upper sleeve with a suction valve is secured by its shank, said suction valve is placed in a closed stepped opening of the shank,
- the sleeve is provided with a securing element with a lock that holds a spring, and the tube on its peripheral part has a ledge and a button interacting therewith,
- a lower sleeve mounted by means of tight fit inside a cavity of the adapting pipe has a recess corresponding to a projection on the piston,
- the toothbrush is designed with a irregularly shaped projection to fit the button,
- the toothbrush may be made as one-piece molded and disposable.

The toothbrush is characterized in that it has a unique dosing trigger composed of elements that fulfill several functions and serve for the basic

concept of the invention, namely, a step-by-step method of filling the chambers of the toothbrush that provides easier control of a toothpaste dose delivery onto the cleaning surface of bristles.

The trigger represents a piston-type vacuum pump using a pomp to obtain vacuum that provides suction of the toothpaste from the container and its delivery from the channel of the hollow tube onto the cleaning surface of the toothbrush by the action of the button. Furthermore, it is very important that all elements are coaxially mounted and deliver the toothpaste along the hollow tube of the toothbrush. The upper sleeve with the pomp is also the holder of the tube contacting with the drive button and the lower sleeve, in which the valve in the form of a diaphragm type compensator is used as a flexible sealing gasket to transfer the toothpaste in the vacuum and pressure area. Moreover, the trigger design in whole is used as a sealing cover for the container, and under the atmospheric pressure the piston rises together with the toothpaste. The embodiment of the piston with a projection 27 corresponding to a recess 26 on the lower sleeve allows emptying the container of the toothpaste.

Brief Description of the Drawing

The invention will now be illustrated by the drawings, in which:

Fig. 1a is a schematic sectional general view of a toothbrush with a container, a piston and a cover;

Fig 1b is a schematic exploded view showing the use of the toothbrush cover for pushing the piston down in order to fill the container with a new dose of the toothpaste;

Fig. 2 is enlarged view of a segment of a dosing trigger (in inoperative rest position);

Fig. 3 is enlarged view of a segment of a dosing trigger (in inoperative rest position), but for a disposable toothbrush.

Detailed Description of the Invention

The toothbrush comprises an elongated toothbrush 1 itself with bristles 2 and slotted outlet opening 3 with a plug 4 on a head 5 of the toothbrush 1 gradually transforming into a tube 6 with a channel 7 that delivers a toothpaste onto a cleaning surface of bristles.

The dosing trigger represented by a common reference number 8 consists of a holder 9 designed in the form of an adapting pipe, which by its one end of the larger diameter fits into a container 10, and by its second end fits into a cover 11 of the toothbrush. In the adapting pipe there are axially mounted two sleeves with one-way valves, moreover, an upper sleeve 12 being a holder of the toothbrush tube is designed is the form of a pomp 13, which is an intermediate chamber between a cavity of the container and a channel in the tube. The sleeve is mounted with the possibility to slide in the adapting pipe and is rigidly connected to the tube by a screw thread 14 defined on its protruding shank 15 and on the end of the tube.

The tube rests on a valve 16 mounted in a closed stepped opening of the shank, while the tube on its peripheral part has a securing element 17 with a lock 18 and a ledge 19 holding a spring 20. A button 21 is mounted on the holder of the trigger with the possibility to contact with the tube through a ledge 22 and imparting the tube together with the pomp a reciprocating movement along the toothbrush.

A lower sleeve 23 mounted by means of a tight fit inside the cavity of the adapting pipe is designed with a radial diaphragm 24, on which a flexible elastic element - a valve 25 is mounted. Furthermore, the diaphragm is made curved to the side of the upper valve and forms inside the sleeve a recess 26 having a shape corresponding to a projection 27 on a piston 28.

Upon compressing the pomp 13 by pressing the button 21 on the tube 6 within the space of the toothbrush over the valve 25 (in the pomp 13 and in the channel 7 of the tube) a high pressure is created, as the result of which the

toothpaste may be delivered from the outlet opening 3 onto the cleaning surface of bristles.

When the button is released, the pomp is expanded – the sucking effect starts. Valves are opened and the toothpaste is sucked into the tube. Filling of the tube by the toothpaste is accompanied by upward moving of the piston along the container. The embodiment of the piston with the projection 27 corresponding to the recess 26 on the lower sleeve provides emptying the container of the toothpaste. Upon emptying the container, the toothbrush is disassembled, washed, and the cover of the toothbrush is used to push the piston into initial position (shown in Fig.1b).

Therefore, initial filling of the intermediate chamber and the channel of the tube by the toothpaste is carried out by successive pressing and release of the button. Upon filling these spaces (this rest position of the toothbrush is shown in Fig. 1a) the toothbrush is ready to use.

By slight pressing the button and release thereof the dose of the toothpaste is delivered onto the cleaning surface of bristles. That is the button serves as if an initiator of a cleaning process.

The toothbrush according to the present invention is convenient in use because it is portable, easy to operate and reliable in use. It is especially suitable for such users as tourists, military men and disabled people.

Although the description is given related to toothbrushes, it should be noted that basic concept of the invention may be applied to other types of devices utilizing consumable materials, for example, cream, shave foam, etc. Therefore, compared to the prior art the claimed invention meets the criterion "novelty" in relation to the reference document, and is not evident to a person skilled in the art because there have not been found similar solutions aimed to solve the problem. Thus, the claimed invention meets the criterion "inventive step", i.e. unobviousness, according to the current law. Industrial application is evident and does not require any additional development for manufacture thereof.

Claims

1.A toothbrush with a toothpaste container and a dosing trigger comprising a head with bristles provided with an outlet opening and a hollow tube for delivery of a toothpaste dose onto its cleaning surface from the container by means of the trigger placed in an intermediate chamber connecting the cavities of the container and the hollow tube, ***characterized in that,*** the toothbrush is provided with an adapting pipe, which by its one end of the larger diameter fits into a container, and by its second end fits into a toothbrush cover, in which two sleeves with one-way valves are coaxially mounted, while the upper sleeve is designed in the form of a pomp rigidly connected to a hollow tube provided with a spring interacting with a drive button imparting the tube reciprocating movement along the toothbrush providing a sucking effect and filling the pomp cavity and the hollow tube with the toothpaste with the subsequent delivery of a dose of the toothpaste onto bristles.

2. A toothbrush according to claim 1, ***characterized in that,*** the tube on its peripheral part is provided with a screw thread, onto which an upper sleeve with a suction valve is secured by its shank, said suction valve is placed in a closed stepped opening of the shank.

3. A toothbrush according to claim 1, ***characterized in that,*** the sleeve is provided with a securing element with a lock that holds a spring, and the tube on its peripheral part has a ledge and a button interacting therewith.

4. A toothbrush according to claim 1, ***characterized in that,*** a lower sleeve mounted by means of tight fit inside a cavity of the adapting pipe has a recess corresponding to a projection on the piston.

5. A toothbrush according to claim 1, ***characterized in that,*** the said toothbrush is designed with an irregularly shaped projection to fit the button.

6. A toothbrush according to claim 1, ***characterized in that***, the said toothbrush is made as one-piece molded and disposable.

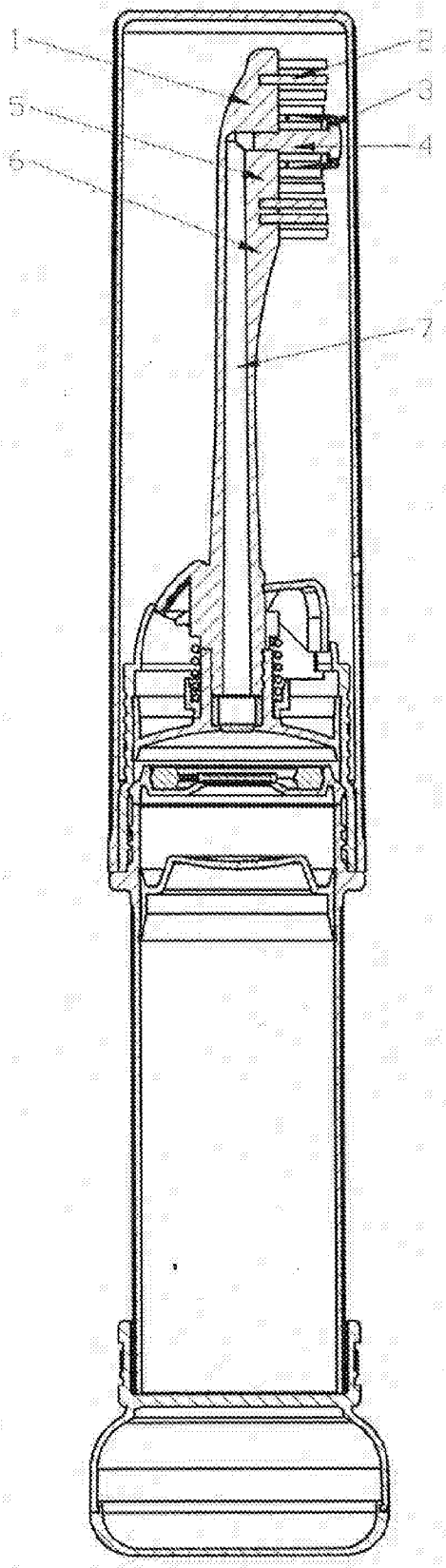

Fig.1a

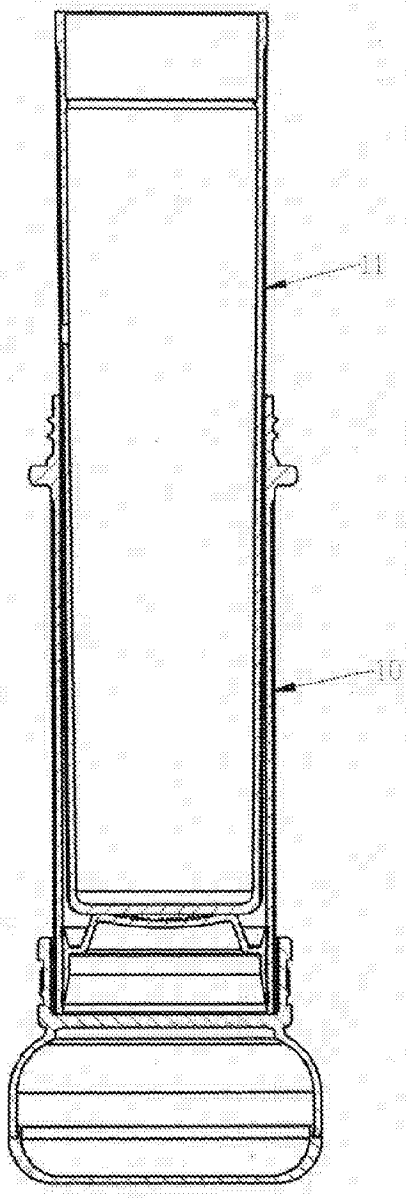

Fig.1b

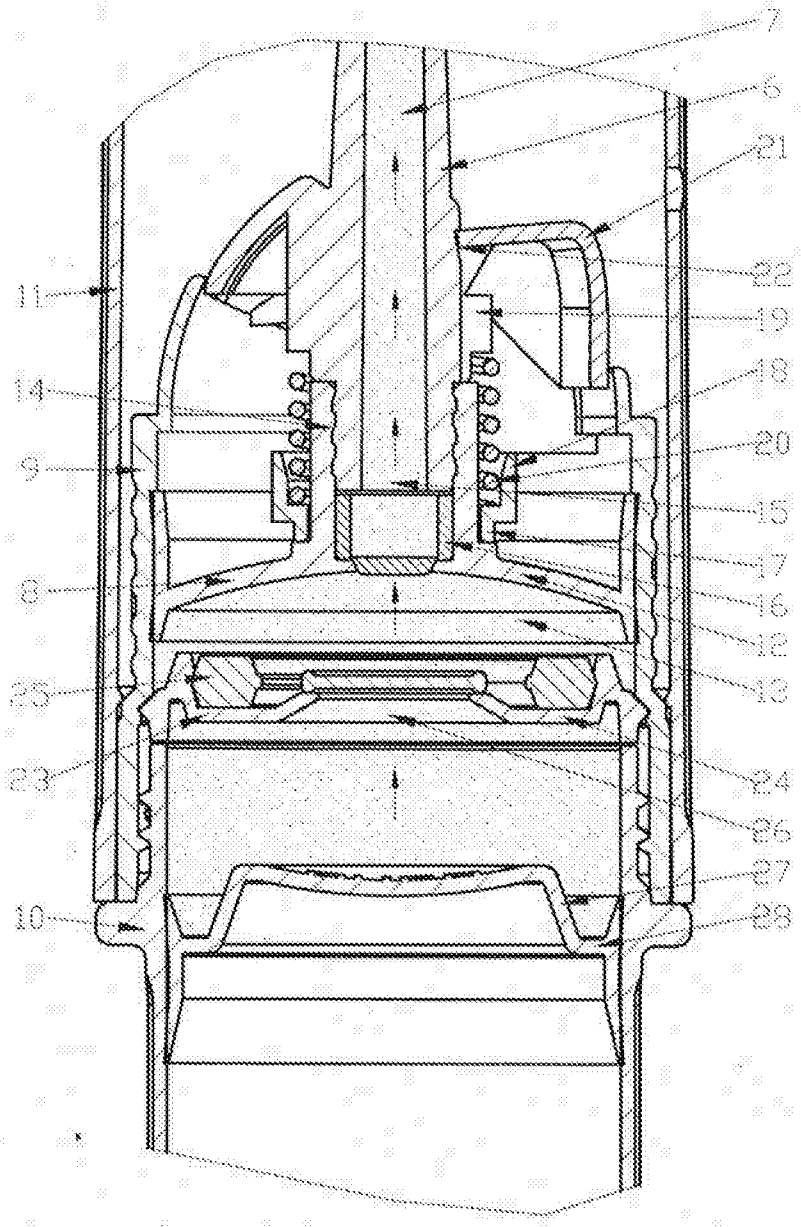

Fig.2

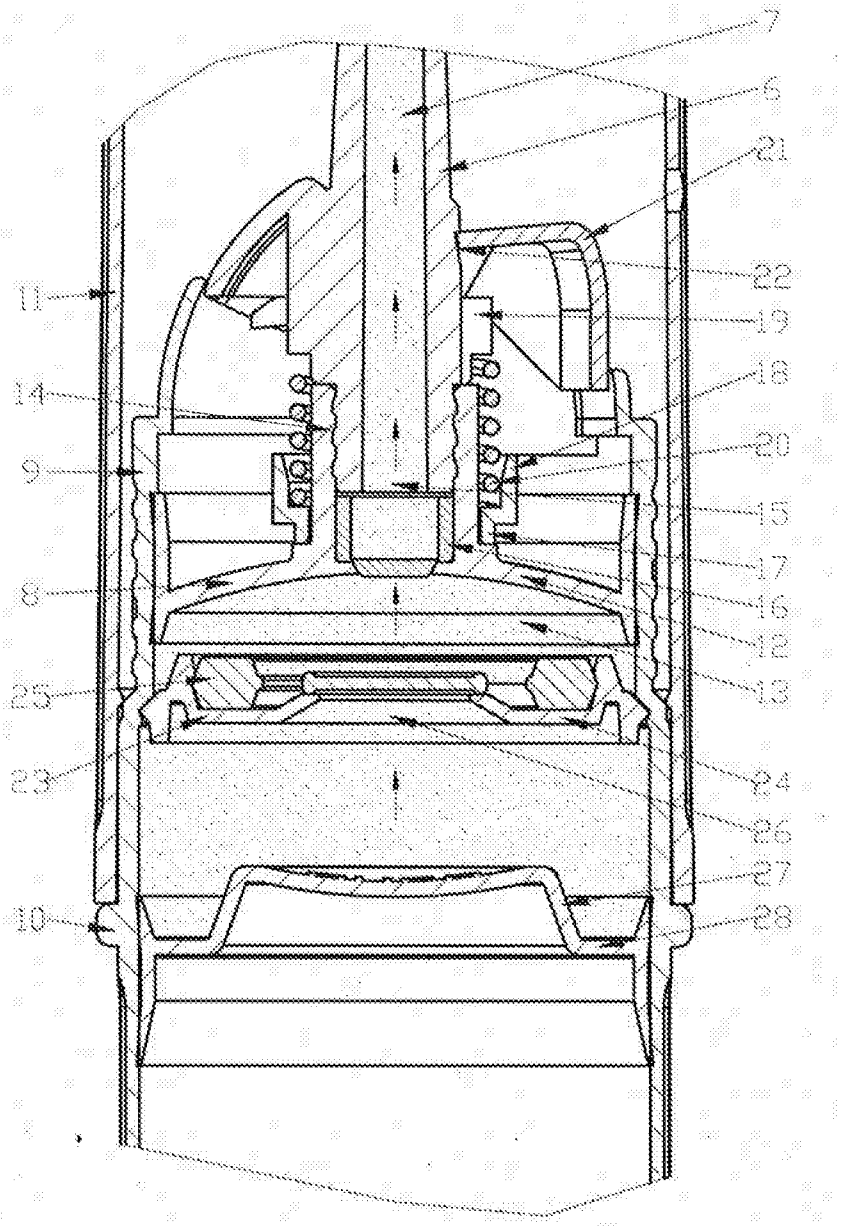

Fig.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/LV2013/000002

A. CLASSIFICATION OF SUBJECT MATTER
INV. A46B11/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 406 207 B1 (WIEGNER GEORG [CN] ET AL) 18 June 2002 (2002-06-18)	1,3-6
Y	abstract column 1, lines 11-23, 57-60 column 3, lines 61-62 column 6, lines 66-67 column 7, lines 1, 3-5; claim 1; figures 1, 3, 4, 16	2

Y	EP 0 193 299 A1 (ENDO SASUKE) 3 September 1986 (1986-09-03)	2
A	page 6, lines 4-5; figures 4-5	1,3-6

A	WO 2007/053384 A1 (GLOVER J SCOTT [US]) 10 May 2007 (2007-05-10) paragraph [0018]; figure 2	1-6

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 October 2013	28/10/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Dal Bó, Paolo

INTERNATIONAL SEARCH REPORT

International application No
PCT/LV2013/000002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95/08934 A1 (KUO YOUTI [US]) 6 April 1995 (1995-04-06) page 22, lines 21-23 page 23, lines 1-5; figure 8d	1-6
A	WO 2007/111522 A2 (S C PRISMA MIRA S R L [RO]; NEDELCU ION [RO]; SARBU ROMULUS LOSIF [RO]) 4 October 2007 (2007-10-04) page 3, line 2; figure 9	1-6
A	FR 2 629 322 A1 (MORIN PHILIPPE [FR]; CELLIER LOUIS [FR]) 6 October 1989 (1989-10-06) page 6, lines 23-27; figure 6	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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