



(51) International Patent Classification:  
B43K 29/00 (2006.01)

(21) International Application Number:  
PCT/IB2016/054174

(22) International Filing Date:  
13 July 2016 (13.07.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
201621004329 8 February 2016 (08.02.2016) IN

(71) Applicant: PIDILITE INDUSTRIES LIMITED [IN/IN];  
Regent Chambers, 7th floor, Jammalal Bajaj Marg, 208,  
Nariman point, Mumbai 400021 (IN).

(72) Inventor: PAREKH, Madhukar Balvantray; 41, Land-  
mark 4th Floor, Carmichael Road, Mumbai, 400026 Maha-  
rashtra (IN).

(74) Agent: GUPTA, Priyank; StratJuris Partners, #302 The  
Capital "B" Wing, Adjacent Regent Plaza, Baner-Pashan  
Link Road, Pune 411045, MH (IN).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,  
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,  
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,  
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,  
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,  
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,  
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,  
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,  
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,  
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,  
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,  
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

**Published:**

- with international search report (Art. 21(3))

(54) Title: A CONNECTING ELEMENT WITH DUAL ENGAGING MEANS

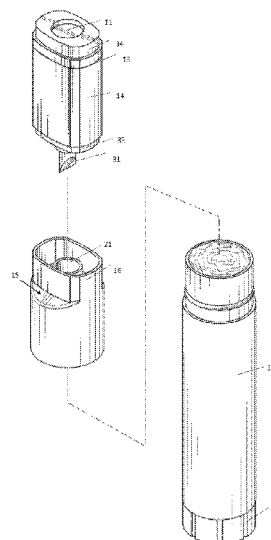


Fig. 5

(57) Abstract: The present invention pertains to a device that allows two different items of daily use to be connected together as a single article for the day to day convenience of the user. The invention employs connecting element which has dual engaging means to secure two articles at a time. It is used as an engaging means and also as a closing means for respective articles. The connecting element has different geometric features at its either ends so that it is used as an engaging means and a closing means for the articles with different geometric features.

WO 2017/137817 A1

## A CONNECTING ELEMENT WITH DUAL ENGAGING MEANS

### CROSS-REFERENCE TO RELATED APPLICATIONS AND PRIORITY

[001] The present application claims priority from Indian Patent Application Number 201621004329 filed on 08<sup>th</sup> February 2016.

### TECHNICAL FIELD

[002] The present invention in general relates to a mechanical component employed to connect two different articles and at the same time maintaining their individual geometric features and providing an airtight environment.

### BACKGROUND

[003] Push-up tubes have become increasingly popular in stationary and cosmetics industry. The major role of these push up tubes is to deliver the sticky substance to a targeted surface and at the same time preventing that such substance does not come in contact with the hands/fingers of the user. Two successful implementations of the push-up tubes are lipsticks and glue sticks.

[004] Most of the times these objects are rendered useless before they are used in their entirety. This happens due to various reasons. One being that the closing means of such objects are usually small and often rollable and they are often misplaced and not re-engaged with the body of the object. The usable life of the object is reduced if they have a missing closing means.

[005] It is always desirable to make our daily use articles as multipurpose. First of all, a multipurpose object save storage space especially in an environment where efficient use of space is desirable like an office desk, pen stand, hand bags or a dressing table. Secondly, such a multipurpose article is less likely to misplaced, since its frequency of use of the multipurpose article is increased.

[006] Two of most frequently used stationary items are glue stick and highlighter. Today these two items are separately available in market. Now there exists no motivation to combine these different articles, since, though they are used in the same set ups, their requirements with respect to the closure caps are unique. The Glue stick closure cap is required to be

circular or triangular depending on the shape of the stick, the cap is required to enclose the stick without coming in contact with the glue. Whereas the highlighter cap is required to maintain an airtight chamber after closure of the cap since the highlighter ink is highly evaporable and has to have an airtight closure mechanism. The highlighter pens need to be closed with air tight cap because any contact with air vaporise the ink and the pen will go dry. Many times the ink dries up if the cap is loose or if the cap gets misplaced.

- [007] Yet another problem that exists especially with glue sticks is their undesirable placement in a Pen Holder/stand. A Pen holder is generally at least 4 inches high, this is because it is meant to rest general stationary items like Pen, pencils, scissors, cutters, highlighter pens and highlighters which are usually no less than 5 inches long. Shorter height of the pen holder allows the stationary items to rest within the pen holder and also project out and lean on the side wall of such pen holder, which makes them easily visible and allows them to be picked up conveniently by the user. At the same time the glue-stick which is also a stationary article used within the same set up is no longer than 2.75 to 3.5 inches. The shorter height of the glue stick allows it to assume a horizontal position in a pen holder thereby not only preventing the other stationary items to rest at the base, but making it difficult for the user to pick it up as the user has to take out all other article before he is able to catch hold of the glue stick.
- [008] Besides while the glue stick and highlighter are separate items, the user has to take care of two different items and it increases the inventory of stationary to be maintained. Moreover, one needs to be very organised with the caps of these items since the small/rollable caps are readily misplaced and being careless in capping the items will render the item useless. Such problem may be also experienced with other consumable items. For e.g. cosmetics a lipstick and eyeliner are frequently used cosmetic products. Also a lip gloss and lip liner are frequently used and possess similar set of technical problems.
- [009] What is needed is an integrated model of two frequently used consumable articles. The integration has to be such that it facilitates greater speed of work, prevents one being stranded in the middle of a job because one of the article is not available.
- [0010] The present invention is directed to an apparatus which solves above problems. Other objects, advantages and novel features will become apparent from the following detailed description of the invention when considered in conjunction with appended drawings.

## SUMMARY

[0011] Before the present apparatus and its components are described, it is to be understood that this disclosure is not limited to the particular apparatus and its arrangement as described, as there can be multiple possible embodiments which are not expressly illustrated in the present disclosure. It is also to be understood that the terminology used in the description is for the purpose of describing the particular versions or embodiments only, and is not intended to limit the scope of the present application. This summary is not intended to identify essential features of the claimed subject matter nor is it intended for use in detecting or limiting the scope of the claimed subject matter.

[0012] In one aspect, the present invention pertains to a connecting element which has dual engaging means to secure two articles for example, lipstick, glue stick, lip balm at one end and highlighter, eyeliner, lip pencil, white board or permanent marker or correction fluid pen at other end; such a connecting element provide airtight closing means on one end and a circular closing means on the other end, wherein the airtight closure end engages the article in upright as well as an inverted position.

[0013] In another aspect, the present invention pertains to a highlighter comprising of a peripheral recess on both the ends of marking elements and a circular groove on opposite end of the highlighter so that it can be engaged with a connecting element in upright and inverted position also the circular groove and recess provide a locking arrangement that prevents the highlighter from popping out of the connecting element when in use.

[0014] It is a primary object of this invention to disclose a connecting element that allows two different articles to be attached together for convenience of day to day user.

[0015] It is a further objective of this invention to disclose an accessory combining glue stick and highlighter which have reservoirs filled with quantities of glue and highlighting ink that are in proportion to each other.

[0016] It is still a further objective of this invention to disclose a single closing means for two different articles. It is difficult to lose the closing means of the glue stick of the present invention since unlike the regular glue stick caps which are cylindrical thus more likely to roll away and forgotten as compared to the connecting element of the present invention

which is bigger and heavier and also engages another element like a highlighter that enables such element to be placed in an upright thus preventing chances for rolling.

[0017] These and other features, aspects, and advantages of the present invention will become better understood with reference to the following description and appended claims.

#### BRIEF DESCRIPTION OF DRAWINGS

[0018] The detailed description is described with reference to the accompanying Figures. In the Figures, the left-most digit(s) of a reference number identifies the Figure in which the reference number first appears. The same numbers are used throughout the drawings to refer like features and components.

[0019] Figure 1 represents the complete assembly of highlighter and glue stick with the highlighting element being engaged in inverted position with various embodiments of the present invention.

[0020] Figure 2 represents the connecting element with perspective view and top view with an embodiment of the present invention.

[0021] Figure 3 represents the elements of the highlighter in with an embodiment of the present invention.

[0022] Figure 4 represents the complete assembly of highlighter and glue stick with the highlighting element being engaged in upright position with an embodiment of the present invention.

#### DETAILED DESCRIPTION

[0023] The present invention relates to a multipurpose device and method of coupling of two articles together with the help of a connecting element. More particularly a connecting element 16 is used to couple a glue stick 17 and a highlighter 14 without changing the design features of a glue stick or of the highlighter.

[0024] In another embodiment of the invention the glue stick 17 may be replaced by a lipstick, glue stick or a lip balm whereas the highlighter 14 may be replaced by a highlighter for use in cosmetics, eyeliner or a lip pencil.

- [0025] The highlighter 14 is an assembly of four sub elements. A plug 11 which makes the bottom end of the highlighter. A reservoir to store the evaporable ink, i.e. consumable body. A housing in which the reservoir is held. The plug 11 and the highlighter 14 housing is joined with an ultra-sonic sealing method. This joint 13 is visible to naked eye. The reservoir housing has a cylindrical protrusion 32 which houses the tip 31 of the highlighter. The tip 31 of the highlighter 14, which makes the top end of the highlighter, is made of a porous material. The highlighter 14 is typically manufactured in a rectangular shape with curved edges. The shape is ergonomic and facilitates easy marking with the help of a cut tip.
- [0026] The glue stick 17 assembly is also made of four sub elements. A screw 18 which is rotated to raise or fall the elevator and in turn the glue stick sitting on the elevator gets raised or falls. A housing for the consumable body, i.e. glue stick 17, covers the glue stick. The glue stick 17 is typically manufactured in a circular shape. This aids the uniform gluing of targeted area.
- [0027] To maintain the unique design features of a glue stick 17 and of highlighter 14 the connecting element 16 is manufactured in a way that it acts as a closing means for the glue stick 17; it acts as a closing means for the highlighter 14 when it is not in use and when it is put in use the connecting element 16 acts as a seating support to hold the highlighter 14.
- [0028] To achieve this the connecting element 16 has one end that acts as a closing means to the glue stick 17 manufactured circular in shape. The other end that acts as a sealing means and engaging means for highlighter has a rectangular shape with curved edges. The circular and rectangular portions of the connecting element are joined by a sloping profile 15. This portion acts like a holding or gripping means for user when the user wants to use the highlighter.
- [0029] The connecting element 16 is essentially hollow tubular mould consisting of a partition 22 that separates the circular and rectangular part. This partition 22 serves to eliminate various problems. It isolates the two articles from each other. It creates an air tight chamber when engaging with the top end of the highlighter 14. The partition 22 is designed in a conical shape to prevent thermal stresses while casting of the element. A cylindrical groove 21 is introduced in this conical partition in which the tip 31 of the highlighter 14 will be rested. This end of the connecting element 16 thus acts as a closing means for the highlighter 14.

The cylindrical groove 21 has an interference fit with the holder of the highlightertip 31. This protects the highlightertip 31 and it is also employed as an additional measure for preventing the evaporation of the highlighter ink.

[0030] To test the airtightness percentage, a standard airtightness test was performed on a working sample of the current multipurpose device. The standard airtightness test involved a specific process that was continued for 7 days. The airtight compartment was filled up to nominal capacity with 50% IPA (Isopropyl Alcohol)water (50%IPA + 50% water) at ambient temperature and proper fitment of closing means was ensured. Any droplets present on the sample were wiped out. The samples were conditioned at 50°C in oven for 2 hours. When removed they were allowed to cool to ambient temperature and after that weighed accurately. For a second time the samples were kept in oven but for 24 hours and 50deg temperature. When removed they were allowed to cool and weigh and this process was repeated for 7 days. The results for this test are tabulated below:

[0031] Performance Observations Airtightness (Loss%)

Test	Initial Sample Losses in %	Final Sample Losses in %
IPA	7.6 %	1.8%
Product (one month)	2.4%	0.35%

The maximum loss calculated for 7 days & did not exceed 2%. Thus the final design of the device was optimized.

[0032] In one embodiment of the invention the end of the connecting element 16 which acts as a closing means and engaging means for highlighter 14 has rectangular shape with curved edges. It has interference fit with the bottom end of the highlighter 14. The bottom end of the highlighter 14 has a recess 34 which fits into the connecting element 16. The depth of the recess equals to the depth available between the rectangular edges of connecting element 16 and the conical shape of partition 22. A click sound assures the user that the highlighter 14 is secured in the groove. Once secured the highlighter 14 can be held in natural pen like orientation. The top end of the highlighter 14 also has similar recess 33 by which it can be secured with the connecting element 16 when not in use.

- [0033] The flat bottom end surface 12 of the highlighter 14, that is also the highlighter plug 11 surface has a circular groove in which has an interference fit with the cylindrical groove 21 present in the conical partition 22. This arrangement insures that the highlighter 14 does not slip when it is engaged in a position to enable writing.
- [0034] In the initial stages of model design, the depth of peripheral recess available on the top end 33 and the bottom end 34 of the highlighter 14 was 2.5 mm. It was found during model testing that the highlighter 14 would frequently pop out of the connecting element 16. This problem was solved by increasing the depth of the peripheral recess from 2.5 mm to 3.7 mm. This modification in the original design optimized the model. Greater depth of recess prevents the highlighter 14 from popping out of the connecting element 16.
- [0035] The quantity of glue available in the glue stick 17 lasts for four to six months' time. The quantity of ink in the reservoir of the highlighter 14 is 3ml. The amount of ink with given cut tip 31 will write up to 100 meters. The life of the glue stick 17 and the highlighter 14 is proportional.
- [0036] The bottom of the glue stick 17 and the bottom of the highlighter 14 have flat end surfaces. This enables the item to be supported in upright position when not in use.
- [0037] The connecting element 16 in this invention is novel in all means. It serves as a closing means for both the glue stick 17 and highlighter 14 and as an airtight sealing for the highlighter 14; also it serves as an engaging means for highlighter 14 when it is put in use.
- [0038] The connecting element 16 is made of thermoplastic. It has high strength-to-density ratio. The present embodiment is manufactured with High-density polyethylene (HDPE), Polypropylene (PP) or Random Copolymer Polypropylene (PPCP). Future embodiment may consist Thermoplastic elastomers (TPE).
- [0039] The ink used in highlighter 14 is highly evaporable. The connecting element 16, when it acts as a cap for highlighter 14 it provides an airtight sealing. This will prevent the air or moisture contact with the tip 31 of the highlighter 14 and prevents the ink from getting evaporated. To make one end of the connecting element 16 function as airtight sealing it has special features. It has interference fit with the top end of highlighter 14. It has a conical shape partition 22 which holds a cylindrical groove 21 in which the tip 31 of highlighter

fits. The combination of conical shape partition 22 and tight fit of tip31 in the groove acts as an airtight sealing. This was proved with standard airtightness test.

[0040] Another embodiment of this invention is a holder on the highlighter 14 so that it can be easily carried around in pockets.

[0041] In yet another embodiment the highlighter is refillable withink.

[0042] The preceding description has been presented with reference to various embodiments of the invention. Persons skilled in the art and technology to which this invention pertains will appreciate that alterations and changes in the described article and its components can be practiced without meaningfully departing from the principle, spirit and scope of this invention.

## CLAIMS

**WE CLAIM:**

1. A connecting element with two ends wherein, the first end is adapted to act as a closing means for a first article and the second end is adapted to act as an airtight sealing and engaging means for a second article.
2. A connecting element as claimed in claim 1 wherein, the first article is a lipstick, glue stick or a lip balm.
3. A connecting element as claimed in Claim 1 wherein, the second article is a highlighter, eyeliner or a lip pencil.
4. A connecting element as claimed in Claim 1 wherein the engaging means is capable of engaging the second article in upright as well as inverted position.
5. A connecting element as claimed in claim 1 adapted to, engaging two different articles in a way that their central axes coincide and the articles remain distinct from each other.
6. A multipurpose device that comprises a glue stick and a highlighter engaged longitudinally by means of a connecting element characterized in that the connecting element has two ends wherein the first end acts as a closure cap of the glue stick and the second end acts as an airtight sealing cap of for the tip of the highlighter wherein, the sealing cap also has a cylindrical groove for resting the highlighter tip.
7. A multipurpose device as claimed in claim 6 wherein the highlighter comprises of: a peripheral recess on both the ends of rectangular housing with curved edges to engage with the connecting element in an upright as well as inverted position.
8. A multipurpose device as claimed in claim 6 wherein the highlighter housing comprises of a circular groove on bottom end surface in a way that it has a tight fit with the cylindrical groove in the connecting element and thus prevents the highlighter from popping out of the connecting element when in use.
9. A multipurpose device as claimed in claim 6 wherein, the device has a total height of at least 5 inches.

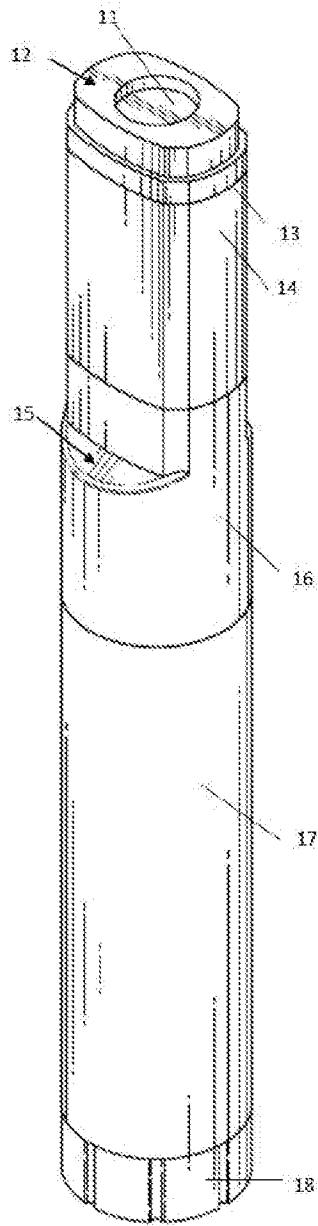
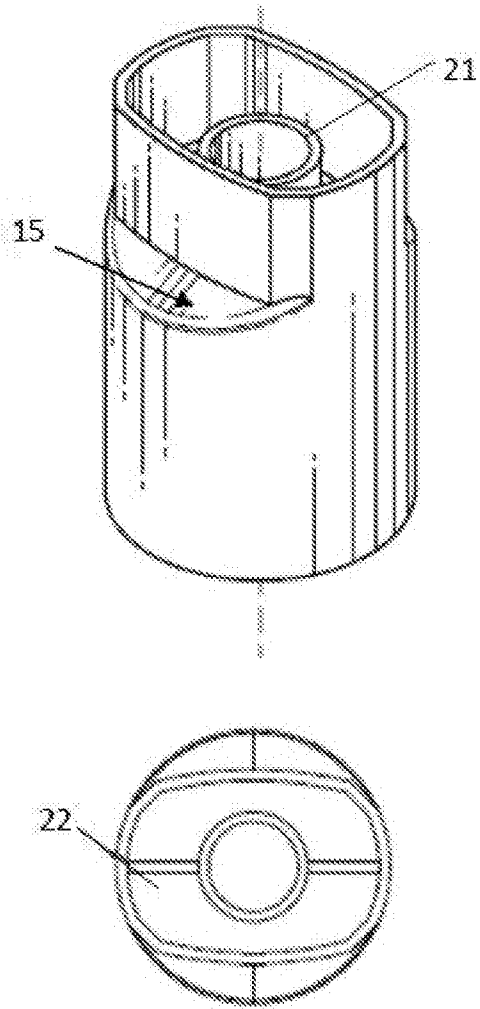


Fig.1



**Fig.2**

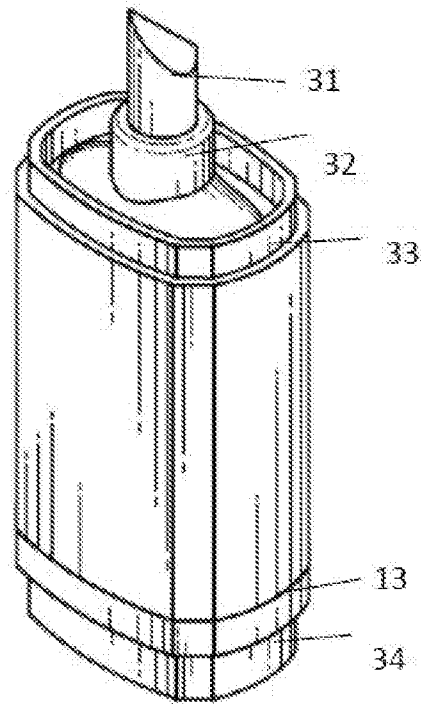
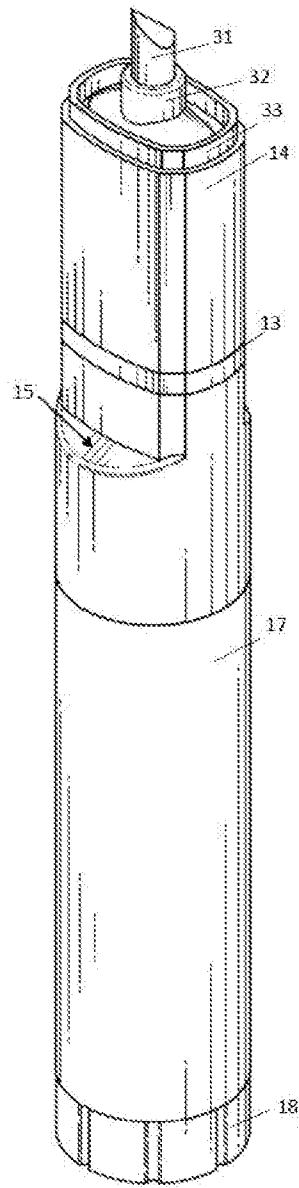
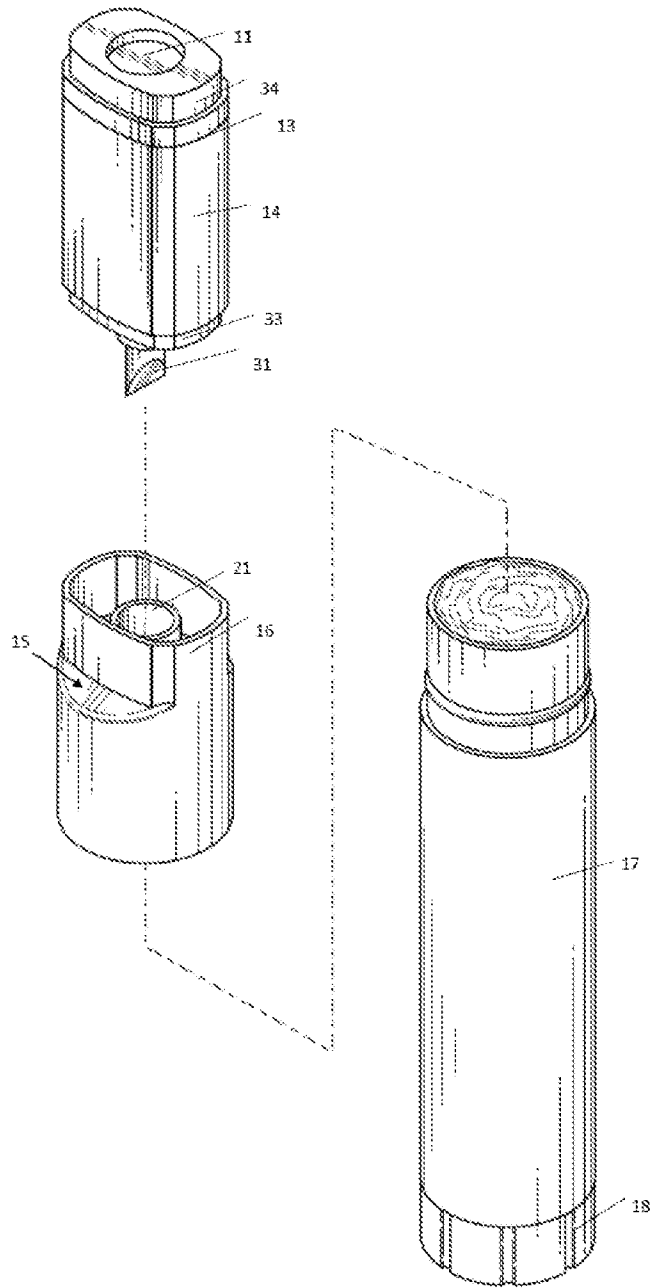


Fig.3



**Fig.4**



**Fig.5**

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2016/054174

A. CLASSIFICATION OF SUBJECT MATTER  
B43K29/00 Version=2016.01

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)

B43K

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)

Patseer, IPO Internal Database

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US5881742 A (HUNSBERGER; GLENN E) March 16, 1999. Column 2, 5 and 6; claim 10 and 18, figure-1 and 2.	1-5
Y	Whole Document -----	1-9
X	CN201371659 Y (YUAN ZHANG) December 30, 2009. Whole Document	1, 4 and 5
Y	Whole Document -----	1-9
X	CN202573470 U (WANG DIAN) December 05, 2012. Abstract; Para [0014-0016], Figures 1-2.	1, 4 and 5
Y	Whole Document	1-9

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 08-12-2016	Date of mailing of the international search report 08-12-2016
---	--

Name and mailing address of the ISA/ Indian Patent Office Plot No.32, Sector 14, Dwarka, New Delhi-110075 Facsimile No.	Authorized officer Sagar B. Pol Telephone No. +91-1125300200
--	--