

WRITING TOOL AND DISPENSING UNIT THEREOF

1. Field of the Invention

The present invention relates to writing stationery, and particularly to a writing tool and a dispensing unit thereof.

2. Description of Related Art

EPO Publication No. 0570866 discloses a writing instrument with an exchangeable ink refill. The ink refill of the writing instrument stores ink by an internal wadding, i.e. the ink is not stored directly in the liquid state inside the ink refill. A pointed member is mounted at one end of an ink dispensing unit to pierce through a film on the ink refill. Therefore, when the film on the ink refill is pierced by the pointed member to form a tiny opening, the ink dispensing unit can be connected with the internal wadding to deliver the ink in the ink refill via the tiny opening. Because the opening is too small and the ink in the ink refill is stored in the internal wadding, the ink-delivering efficiency of the ink dispensing unit is not high and some of the ink tends to remain in the ink refill.

TW Publication No. 201511981 discloses a conventional writing implement with a replaceable ink cartridge. Ink inside the ink cartridge can be dispensed after a plug located at a bottom end of the ink cartridge is pressed to open the ink cartridge. As shown in Figs. 4 to 6 of the '981 patent publication, an embodiment discloses that a protrusion formed on and protruding from a main body of the conventional writing implement can press the plug, and then the plug is displaced to open the bottom end of the replaceable ink cartridge, so the ink can be delivered from the replaceable ink cartridge to the main body of the conventional writing implement.

Another embodiment shown in Fig. 11 of the '981 patent publication discloses that a protrusion formed on and protruding from the main body of the conventional writing implement is pushed against the plug. The plug of the replaceable ink cartridge is made of a hard material to be not easily destructible.

5 Therefore, when the plug is pushed by the protrusion, the plug will be overturned to open the replaceable ink cartridge and the ink can be delivered from the ink cartridge to the main body of the conventional writing implement.

As inferred from the above, when the plug is displaced or overturned, the movement of the plug may block the replaceable ink cartridge accidentally to
10 result in unsmooth delivery of the ink. Besides, with reference to the embodiment indicated in Fig. 11 of the '981 patent publication, the protrusion is too close to an internal periphery of the replaceable ink cartridge, so the replaceable ink cartridge may easily interfere with the protrusion in the process of installing the ink cartridge into the conventional writing implement, making
15 the process not smooth.

When the aforesaid conventional ink-exchangeable writing tool is operated to replace its ink cartridge, an ink dispensing unit or a main body of the writing tool is used to deliver the ink by piercing a film or pushing a plug. Taking the former as an example, an opening being formed on the film is too small to be
20 advantageous to delivery of the ink. Taking the latter as an example, the plug being displaced or overturned may block the delivery of the ink. Thus, either will cause unfavorable delivery of the ink.

To overcome the shortcomings of the conventional writing tools, the present invention provides a writing tool and a dispensing unit thereof.

IN THE DRAWINGS:

Fig. 1 is a perspective view of a first embodiment of a writing tool in accordance with the present invention;

Fig. 2 is an exploded perspective view of a part of the writing tool shown
5 in Fig. 1;

Fig. 3 is a sectional view of a dispensing unit of the writing tool shown in Fig. 1;

Fig. 4 is another sectional view of the dispensing unit of the writing tool shown in Fig. 1;

10 Fig. 5 is a schematic view of a part of the writing tool in operation, showing that a cap rotatably drives and enables a replaceable ink cartridge to be installed in a dispensing unit;

Fig. 6 is an enlarged and sectional view of a part of the writing tool in operation, showing that a film of the replaceable ink cartridge is to be cut in the
15 process of rotatably installing the replaceable ink cartridge into the dispensing unit;

Fig. 7 shows that the film of the replaceable ink cartridge is being cut in the process of rotatably installing the replaceable ink cartridge into the dispensing unit;

20 Fig. 8 shows that the film has been cut in the process of rotatably installing the replaceable ink cartridge into the dispensing unit;

Fig. 9 is a schematic view of a part of the replaceable ink cartridge, showing statuses of the film of the replaceable ink cartridge before and after the film is cut;

Fig. 10 is another sectional view of the writing tool, showing the statuses of the film of the replaceable ink cartridge before and after the ink cartridge is forcefully pressed directly into the dispensing unit;

Fig. 11 is a perspective view of the dispensing unit of the writing tool in accordance with a second embodiment of the present invention; and

Fig. 12 is a perspective view of the dispensing unit of the writing tool in accordance with a third embodiment of the present invention.

First of all, directional references, such as “outer”, “inner”, “external”, “internal”, “outward”, “inward”, “downward”, “upward”, “top”, “bottom”, “uppermost”, “lowermost”, “anterior”, and the like, are only used based on conventional orientation of the drawings for identification purposes to facilitate the reader to understand the present invention by reference to the drawings and do not limit the associated elements, particularly as to the position, orientation, or use of this disclosure. Also, a person skilled in the art should notice this description may contain other terminology to convey position, orientation, and direction without departing from the principles of the present invention.

With reference to Figs. 1 and 2, a writing tool constructed in accordance with a first embodiment of the present invention includes a writing unit 10, a capillary member 20, a dispensing unit 30, a replaceable ink cartridge 40, and a cap 50.

The writing unit 10 includes a tube 11 and a nib 12. The tube 11 is cylindrical and has a head portion 110, a tail portion 111, and an assembling space 112 formed internally between the head portion 110 and the tail portion 111. A plurality of internal threads 113 protrude and extend spirally from an

inner periphery of the tail portion 111. A plurality of discontinuities 114 are formed at anterior ends of the internal threads 113, respectively, for positioning the cap 50. The nib 12 is mounted to the head portion 110 of the tube 11 for dispensing ink (not shown) to write.

5 As shown in Fig. 2, the capillary member 20 is mounted in the assembling space 112 of the tube 11 and has one end contacting a distal end of the nib 12. The capillary member 20 is made of a cotton-based material for temporary storage and occlusion of ink (not shown).

Referring to Fig. 3 in view of Fig. 2, the dispensing unit 30 is mounted in
10 the assembling space 112 of the tube 11 and abuts against one end of the capillary member 20. The dispensing unit 30 includes an outbound part 31, an inbound part 32, and a dispensing passage 33 communicating with the outbound part 31 and the inbound part 32. A partition plate 34 is formed between the inbound part 32 and the outbound part 31 for making the outbound part 31 and
15 the inbound part 32 two opposite ends of the dispensing passage 33. The outbound part 31 has an ink guiding tube 311, an outer annular portion 312, a plurality of guiding outlets 313, and a plurality of baffles 314. The ink guiding tube 311 and the outer annular portion 312 extend downwardly from the partition plate 34, respectively. The ink guiding tube 311 extends lengthwise downwardly
20 and goes beyond the outer annular portion 312. The outer annular portion 312 surrounds the ink guiding tube 311. The guiding outlets 313 are annularly or radially formed at a bottom end of the ink guiding tube 311 for outwardly guiding the ink from the ink guiding tube 311. The baffles 314 are formed between the ink guiding tube 311 and the outer annular portion 312 and arranged

at equal intervals. Each of the baffles 314 protrudes from the ink guiding tube 311 and extends axially along the ink guiding tube 311 toward outside from the partition plate 34, being axially slightly longer than the outer annular portion 312. The baffles 314 are used for pushing against the capillary member 20.

5 Referring to Fig. 4 in view of Figs. 2 and 3, the inbound part 32 has two cutting portions 321, a first coupling portion 322, an internal passage 323, an external passage 324, and two guiding gaps 325. Each of the cutting portions 321 extends upwardly from the partition plate 34. The first coupling portion 322 is annularly formed around the cutting portions 321. The two cutting portions 321
10 are located opposite to each other and can be, in a cross-sectional view, symmetrically or asymmetrically curved. Each of the cutting portions 321 has a cutting edge 3210 formed on an uppermost side of the cutting portion 321. Each of the cutting edges 3210 is sharp and extends continuously along a lengthwise direction thereof. Each of the cutting edges 3210 has at least one first sharp end
15 and at least one second sharp end. A height difference H is defined vertically between the first sharp end and the second sharp end for each of the cutting edges 3210.

 In the first embodiment of the present invention, each of the cutting edges 3210 of the cutting portions 321 is curved and inclined downwardly
20 clockwise from the first sharp end to the second sharp end of the cutting edge 3210. Alternatively, each of the cutting edges 3210 of the cutting portions 321 can be curved and inclined downwardly counterclockwise from the first sharp end to the second sharp end of the cutting edge 3210. Lengths of the cutting edges 3210 of the cutting portions 321 can be equal or unequal to each other. In

the first embodiment of the present invention, the lengths of the cutting edges 3210 of the cutting portions 321 are unequal to each other, i.e. the length of the cutting edge 3210 of one said cutting portion 321 is larger than that of the other cutting edge 3210. This structure can accurately keep a film (not shown) of an ink cartridge (not shown) from disengaging from the ink cartridge after the cutting edges 3210 annularly pierce and cut the film.

As shown in Figs. 2 and 3, the internal passage 323 is surrounded by the cutting portions 321 and communicates with the ink guiding tube 311. The external passage 324 is defined between the cutting portions 321 and the first coupling portion 322. Each of the two guiding gaps 325 is formed between adjacent sides of the cutting portions 321 and communicates with the internal passage 323 and the external passage 324. Ink (not shown) can be guided and delivered through the guiding gaps 325. The first coupling portion 322 of the inbound part 32 has an abutting edge 3220 and two sealing ribs 3221. The abutting edge 3220 is annularly formed at an outer periphery of the first coupling portion 322 and is connected with the outer annular portion 312. The two sealing ribs 3221 are annularly formed at the outer periphery of the first coupling portion 322.

An assembly stroke L is defined axially between the abutting edge 3220 and an uppermost end of the first coupling portion 322. The assembly stroke L is larger than the height difference H. The dispensing unit 30 further has a plurality of elongated engaging convexities 35 formed annularly at the outer periphery of the first coupling portion 322 and located between the abutting edge 3220 and the outer annular portion 312. The engaging convexities 35 enable the

dispensing unit 30 to be engaged with the tube 11 to prevent the dispensing unit 30 from disengaging from the tube 11. The dispensing passage 33 is defined to include an inner space of the ink guiding tube 311 of the outbound part 31 and the internal passage 323 of the inbound part 32 for delivery of ink (not shown) to
5 the capillary member 20.

As shown in Figs. 2 and 6, the replaceable ink cartridge 40 is mounted in the assembling space 112 and the cap 50 and communicates with the dispensing unit 30. The replaceable ink cartridge 40 is tubular and has ink (not shown) stored therein, a second coupling portion 41, and a film 42. The second coupling
10 portion 41 is formed at one end of the replaceable ink cartridge 40. The replaceable ink cartridge 40 is connected with the dispensing unit 30 in such a way that the second coupling portion 41 is sleeved onto the first coupling portion 322. Outer and inner diameters of the second coupling portion 41 are larger than those of other parts of the replaceable ink cartridge 40. The outer diameter of
15 each said sealing rib 3221 can be larger than or equal to the inner diameter of the second coupling portion 41. Preferably, the outer diameter of each said sealing rib 3221 is larger than the inner diameter of the second coupling portion 41. The second coupling portion 41 has a plurality of abutting ribs 410 and a stepped edge 411. The abutting ribs 410 are annularly arranged at an outer periphery of
20 the replaceable ink cartridge 40 at equal intervals and extend upwardly from an uppermost end of the second coupling portion 41. The stepped edge 411 is annularly formed at an inner periphery of the second coupling portion 41. A sleeving stroke L1 is defined between the stepped edge 411 and a lowermost end of the second coupling portion 41. The sleeving stroke L1 is substantially as long

as the assembly stroke L. Referring to Figs. 2 and 6 again, the film 42 is made of a soft material and mounted to the stepped edge 411 of the second coupling portion 41 by heat sealing. Preferably, the film 42 is made of polyethylene (PE) and aluminum foil, so the film 42 can be preferably adhered to the replaceable
5 ink cartridge 40 and has great expandability. The ink is sealed inside the replaceable ink cartridge 40 by the film 42. When the film 42 is pierced and cut by either of the cutting portions 321 of the dispensing unit 30, the ink can flow outwardly from the second coupling portion 41 and be guided to the dispensing unit 30, so that the dispensing passage 33 and the replaceable ink cartridge 40
10 can communicate with each other.

Referring to Figs. 1 and 2 again, the cap 50 is sleeved onto the replaceable ink cartridge 40 and is threadably mounted in the assembling space 112 of the tube 11. The cap 50 is hollow and has an assembling segment 51, a plurality of external threads 52, a plurality of engaging ribs 53, and a plurality of
15 push lugs 54. The assembling segment 51 is tubular and has a shape corresponding to that of the assembling space 112. The external threads 52 are spirally formed on the assembling segment 51, corresponding to the internal threads 113, respectively. The engaging ribs 53 are formed and annularly arranged at uppermost ends of the external threads 52, respectively,
20 corresponding to the discontinuities 114 in location. The push lugs 54 are formed and annularly arranged at a lowermost side of the assembling segment 51 at equal intervals, corresponding to the abutting ribs 410 in location, respectively.

How the first embodiment of the present invention is operated is shown in Figs. 5 to 9, indicating a process of installing the replaceable ink cartridge 40

by means of threaded connection. When the replaceable ink cartridge 40 of the writing tool runs out of ink (not shown), the replaceable ink cartridge 40 can be removed from the writing tool and replaced by another fresh replaceable ink cartridge (not shown) as recited hereinafter.

5 First of all, put the replaceable ink cartridge 40 into the assembling space 112 of the tube 11, sleeve the cap 50 onto the replaceable ink cartridge 40, and then screw the cap 50 into the tube 11 gradually in such a way that the external threads 52 of the cap 50 engage the internal threads 113 of the tube 11. After the abutting ribs 410 of the replaceable ink cartridge 40 are moved to
10 contact the lowermost side of the assembling segment 51, the abutting ribs 410 can push the push lugs 54, respectively, to drive the replaceable ink cartridge 40 to move spirally downwardly along with the cap 50.

 After that, the second coupling portion 41 of the replaceable ink cartridge 40 is initially sleeved onto the first coupling portion 322 of the
15 dispensing unit 30 and meanwhile, the first sharp end of each said cutting portion 321 is pushed against the film 42, and the second coupling portion 41 engages the uppermost sealing rib 3221 to seal the second coupling portion 41 and the first coupling portion 322, so none of any gap is formed between the second coupling portion 41 and the first coupling portion 322. In this way, the ink can be
20 prevented from leaking out from the second coupling portion 41 or the first coupling portion 322 when the film 42 is accidentally pierced. When the replaceable ink cartridge 40 is further driven to move downwardly by the cap 50, the second coupling portion 41 can be forced to pass the two sealing ribs 3221 and finally the stepped edge 411 abuts against the abutting edge 3220. In the

meantime, referring to Fig. 2 again in view of Fig. 5, the engaging ribs 53 of the cap 50 are engaged with the discontinuities 114, so the cap 50 and the tube 11 are fixedly connected with each other.

As shown in Figs. 6 to 8, when the replaceable ink cartridge 40 is driven
5 to move downwardly by the cap 50, the film 42 of the replaceable ink cartridge 40 is gradually moved to the cutting edge 3210 of each said cutting portion 321 until either or both of the first sharp ends of the cutting edges 3210 pierce and cut the film 42.

As shown in Figs. 8 and 9, a stroke of the cap 50 is limited by the internal
10 thread 113 of the tube 11, so when the replaceable ink cartridge 40 is rotated for an angle about 180 degrees, the film 42 of the replaceable ink cartridge 40 will be cut by the cutting edges 3210 of the two cutting portions 321 to form two curved outlets 420, respectively. However, two ends of either of the two curved outlets 420 do not completely overlap those of the other, so the whole film 42
15 still remains on the stepped edge 411 and blocks none of the internal passage 323 and the external passage 324 of the dispensing unit 30. In this way, the ink flows into the dispensing passage 33 of the dispensing unit 30 from the replaceable ink cartridge 40. As shown in Figs. 1 to 3, the ink is guided to the capillary member 20 and the nib 12 via the outbound part 31, so the ink can be dispensed fluently
20 for smooth writing. Partial ink may though flow into the external passage 324, but the ink flowing into the external passage 324 can be guided back to the internal passage 323 through the guiding gaps 325, so the ink is not subject to stagnation in the inbound part 32.

How the first embodiment of the present invention is alternatively

operated is shown in Figs. 10, 2, and 5, indicating a process of installing the replaceable ink cartridge 40 by means of forceful pressing. When the replaceable ink cartridge 40 of the writing tool runs out of ink, the replaceable ink cartridge 40 can be removed from the writing tool and replaced by another replaceable ink cartridge (not shown) as recited hereinafter.

Referring to Fig. 10, while the replaceable ink cartridge 40 is directly pressed forcefully and downwardly toward the two cutting portions 321 of the inbound part 32, the film 42 can be pierced and cut by either or both of the first sharp ends of the cutting portions 321. After that, the ink can flow into the dispensing passage 33 of the dispensing unit 30 from the replaceable ink cartridge 40 and then guided to the capillary member 20 and the nib 12 via the outbound part 31, so the ink can be dispensed fluently for smooth writing. Referring to Fig. 5, the cap 50 is finally screwed into the tube 11, so the assembly of the writing tool is completed.

Referring to Fig. 11, a second embodiment of the present invention is similar to the first embodiment of the present invention and has the following difference therefrom. The inbound part 32A has nothing but one said cutting portion 321, whose shape is substantially the same as that of either of the cutting portions 321 of the first embodiment. The internal passage 323 is surrounded by the cutting portion 321. The external passage 324 surrounds the cutting portion 321. The internal passage 323 communicates with the external passage 324, indicating that the external passage 324 communicates with the dispensing passage 33. Since the other structural features of the second embodiment are the same as those of the first embodiment of the present invention, detailed

descriptions thereof are thus omitted.

Referring to Fig. 12, a third embodiment of the present invention is similar to the first embodiment of the present invention and has the following difference therefrom. The dispensing unit 30B has three said cutting portions 5 321, whose shapes are substantially the same as those of the cutting portions 321 of the first embodiment. The internal passage 323 is defined among the cutting portions 321, indicating that the internal passage 323 is surrounded by the cutting portions 321. The external passage 324 surrounds the cutting portions 321 and is located between the cutting portions 321 and the first coupling portion 10 322. Three said guiding gaps 325 are formed and communicate with the internal passage 323 and the external passage 324. Since the other structural features are identical to those of the first embodiment of the present invention, detailed descriptions thereof are thus omitted.

The dispensing unit 30 of the present invention forms the at least one 15 cutting portion 321 and the at least one cutting portion 321 forms the at least one sharp cutting edge 3210 for piercing and cutting. The replaceable ink cartridge 40 seals the ink by means of the soft film 42. As the replaceable ink cartridge 40 is mounted onto the dispensing unit 30, the film 42 can be pierced and cut by the at least one cutting portion 321 of the dispensing unit 30, so the ink can be 20 dispensed from the replaceable ink cartridge 40 smoothly into the capillary member 20 and the writing unit 10. Therefore, when it is necessary for a user to replace the replaceable ink cartridge 40 running out of the ink, no residual ink tends to be available nor stain the user's hand. The number, shape, and other structural features of the at least one cutting portion 321 can be changed without

any limitation as it depends.

The replaceable ink cartridge 40 can completely cover the dispensing unit 30. Furthermore, the first coupling portion 322 forms the two sealing ribs 3221, and each of the outer diameters of the sealing ribs 3221 is slightly larger than the inner diameter of the second coupling portion 41, so the second coupling portion 41 has to be slightly forced to pass the sealing ribs 3221 in the process of the assembly. In this way, leakage of the ink can be prevented from the dispensing unit 30 in the process of the assembly or replacement of the replaceable ink cartridge 40.

The replaceable ink cartridge 40 can be assembled with the dispensing unit 30 by the threaded connection or the forceful pressing. After the film 42 of the replaceable ink cartridge 40 is pierced and cut by the dispensing unit 30, the film 42 still can remain on the stepped edge 411 of the replaceable ink cartridge 40. This prevents the film 42 stained with residual ink from falling off the replaceable ink cartridge 40, thereby avoiding dirtying the user's hand or any nearby object when the replaceable ink cartridge 40 is being replaced. The film 42 having residual ink can be discarded or recycled together with the replaceable ink cartridge 40.

In addition, when the replaceable ink cartridge 40 is mounted on the dispensing unit 30, the dispensing unit 30 has the external passage 324 between the at least one cutting portion 321 and the first coupling portion 322 for guiding the ink and the location of the at least one cutting portion 321 is far away from the first coupling portion 322, so the at least one cutting portion 321 can be prevented from interfering with the stepped edge 411 of the replaceable ink

cartridge 40 in the process of the assembly, thereby protecting the at least one cutting portion 321 from damage.

Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing descriptions, together with details
5 of the structure and function of the present invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the present invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

CLAIMS:

1. A writing tool comprising:

a writing unit (10) having

5 a tube (11); and

a nib (12) mounted at an end of the tube (11);

a capillary member (20) mounted in the tube (11) and contacting the nib
(12);

a dispensing unit (30) mounted in the tube (11) and having

10 an inbound part (32) having at least one cutting portion (321), a
first coupling portion (322), and an external passage (324), the at least one
cutting portion (321) having at least one sharp cutting edge (3210) formed on a
top thereof, the first coupling portion (322) surrounding the at least one cutting
portion (321), the external passage (324) being defined between the at least one
15 cutting portion (321) and the first coupling portion (322);

an outbound part (31) contacting the capillary member (20); and

a dispensing passage (33) communicating with the outbound part
(31) and the external passage (324) of the inbound part (32); and

a replaceable ink cartridge (40) mounted in the tube (11) and
20 communicating with the dispensing unit (30), the replaceable ink cartridge (40)
having:

a second coupling portion (41) connected with the first coupling
portion (322);

ink contained in the replaceable ink cartridge (40); and

a film (42) cut by the at least one cutting edge (3210) for output of the ink.

2. The writing tool as claimed in claim 1, wherein the at least one
5 cutting edge (3210) comprises at least one first sharp end and at least one second sharp end, and a height difference (H) is defined between the at least one first sharp end and the at least one second sharp end.

3. The writing tool as claimed in claim 2, wherein the first coupling
10 portion (322) comprises an abutting edge (3220) annularly formed at an outer periphery thereof and defines an assembly stroke being an axial distance between the abutting edge (3220) and an uppermost side of the first coupling portion (322), the assembly stroke being larger than the height difference of the at least one cutting portion (321).

15

4. The writing tool as claimed in claim 2, wherein the dispensing unit (30) comprises at least two said cutting portions (321) arranged annularly and spaced at intervals.

20 5. The writing tool as claimed in claim 2, wherein the at least one cutting edge (3210) is curved and inclined from the at least one first sharp end to the at least one second sharp end.

6. The writing tool as claimed in claim 4, wherein each of the cutting edges (3210) of the at least two cutting portions (321) is curved and inclined from the at least one first sharp end to the at least one second sharp end.

5 7. The writing tool as claimed in claim 1, wherein the dispensing passage (33) comprises an internal passage (323) surrounded by the at least one cutting portion (321) and communicating with the external passage (324) via at least one guiding gap (325).

10 8. The writing tool as claimed in claim 4, wherein the dispensing passage (33) comprises an internal passage (323) surrounded by the at least one cutting portion (321) and communicating with the external passage (324) via at least one guiding gap (325).

15 9. The writing tool as claimed in claim 1, wherein the first coupling portion (322) of the inbound part (32) comprises at least one sealing rib (3221), an outer diameter of the at least one sealing rib (3221) being not smaller than an inner diameter of the second coupling portion (41).

20 10. The writing tool as claimed in claim 1 further comprising a cap (50) sleeved onto the replaceable ink cartridge (40) for rotatably driving and enabling the replaceable ink cartridge (40) to be installed into the tube (11).

11. The writing tool as claimed in claim 10, wherein

the cap (50) comprises a plurality of push lugs (54) formed annularly at a lowermost side thereof and spaced at intervals;

the second coupling portion (41) comprises a plurality of abutting ribs
5 (410) formed annularly at an outer periphery of the replaceable ink cartridge (40) and spaced at intervals; and

the cap (50) rotatably drives and enables the replaceable ink cartridge (40) to be installed into the tube (11) in such a way that the push lugs (54) are pushed against the abutting ribs (410), respectively.

10

12. A dispensing unit (30) of a writing tool, the writing tool having a capillary member (20), a tube (11), and a replaceable ink cartridge (40), the dispensing unit (30) being mounted in the tube (11) and comprising:

an outbound part (31) contacting the capillary member (20);

15 an inbound part (32) having

at least one cutting portion (321) having at least one sharp cutting edge (3210) formed on a top thereof;

a first coupling portion (322) surrounded by the at least one cutting portion (321); and

20 an external passage (324) defined between the at least one cutting portion (321) and the first coupling portion (322); and

a dispensing passage (33) communicating with the outbound part (31) and the external passage (324) of the inbound part (32).

13. The dispensing unit (30) of the writing tool as claimed in claim 12, wherein the at least one cutting edge (3210) comprises at least one first sharp end and at least one second sharp end, and a height difference (H) is defined between the at least one first sharp end and the at least one second sharp end.

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14. The dispensing unit (30) of the writing tool as claimed in claim 13, wherein the first coupling portion (322) comprises an abutting edge (3220) annularly formed at an outer periphery thereof and defines an assembly stroke being an axial distance between the abutting edge (3220) and an uppermost side of the first coupling portion (322), the assembly stroke being larger than the height difference of the at least one cutting portion (321).

15. The dispensing unit (30) of the writing tool as claimed in claim 13, wherein the dispensing unit (30) comprises at least two said cutting portions (321) arranged annularly and spaced at intervals.

16. The dispensing unit (30) of the writing tool as claimed in claim 13, wherein the at least one cutting edge (3210) is curved and inclined from the at least one first sharp end to the at least one second sharp end.

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17. The dispensing unit (30) of the writing tool as claimed in claim 15, wherein each of the cutting edges (3210) of the at least two cutting portions (321) is curved and inclined from the at least one first sharp end to the at least one second sharp end.

18. The dispensing unit (30) of the writing tool as claimed in claim 12,
wherein the dispensing passage (33) comprises an internal passage (323)
surrounded by the at least one cutting portion (321), and the internal passage
5 (323) communicates with the external passage (324) by at least one guiding gap
(325).

19. The dispensing unit (30) of the writing tool as claimed in claim 15,
wherein the dispensing passage (33) comprises an internal passage (323)
10 surrounded by the at least two cutting portions (321), and the internal passage
(323) communicates with the external passage (324) via at least two guiding
gaps (325).

ABSTRACT:**WRITING TOOL AND DISPENSING UNIT THEREOF**

A writing tool includes a writing unit (10), a capillary member (20), a dispensing unit (30), and a replaceable ink cartridge (40). The capillary member (20), the dispensing unit (30), and the replaceable ink cartridge (40) are mounted in the writing unit (10). The dispensing unit (30) contacts the capillary member (20) and has at least one cutting portion (321). The replaceable ink cartridge (40) accommodates ink therein and has a film (42) at one end thereof. The replaceable ink cartridge (40) is installed in the dispensing unit (30) and the film (42) is pierced and cut by the cutting portion (321). The ink flows through the film (42) and is delivered to the writing unit (10) via the capillary member (20) and the dispensing unit (30) for writing. The writing tool (10) dispenses the ink fluently and leaves no residual ink.

Fig. 2