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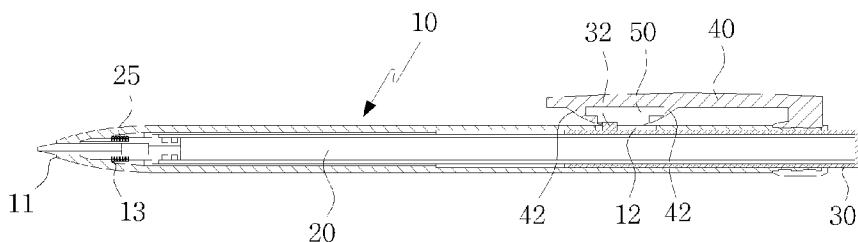
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(54) Title: WRITING INSTRUMENT

[Fig. 1]



(57) Abstract: A writing instrument includes: a case having an inlet, through which a pen-tip is drawn in or out, formed at a front part of the case; a refill movably disposed at an interior of the case; a spring elastically supporting the refill respective to the case; a clip fixed to an exterior of the case so as to be clipped with a pocket, etc.; a knocking part moving frontward and backward along a rear side of the case so as to allow the refill to be moved; a clip gear rotatably installed at the clip so as to be positioned in a passing hole formed at one side surface of the case; and one protuberance extending from the knocking part and or from an outer surface of the refill so as to perform relative movement respective to the clip gear through the passing hole of the case, wherein a first guide groove formed on an outer circumferential surface of the clip gear, a locking recess formed at a rear side of a front part of the first guide groove, a second guide formed at one side of the locking recess, and a third guide groove extending from the second guide groove to a rear end of the first guide groove, are integrally connected with each other so that a circulating path is formed, wherein the protuberance sequentially circulates along the first guide groove, the second guide groove, and the third guide groove according to a movement of the knocking part.

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Description

WRITING INSTRUMENT

Technical Field

- [1] The present invention relates to a writing instrument, and more particularly to a writing instrument including a pen-tip actuating apparatus for fixing or releasing a position of a pen-tip so as to maintain the pen-tip exposed out of the writing instrument or to cause the pen-tip to be automatically retracted into the writing instrument when the pen-tip is drawn in or out through one end of the writing instrument.

Background Art

- [2] In general, a writing instrument includes a case, pen-tip, a spring, a pen-tip actuating apparatus, etc., and further includes a clip so as to allow a user to clip the writing instrument to a pocket.
- [3] When the user uses such a writing instrument, the user operates a pen-tip actuating apparatus so as to allow a pen-tip to be drawn out of a case, and when the user does not want to use it, the user operates a pen-tip actuating apparatus so as to allow the pen-tip to be retracted into the case and can clip the writing instrument to a pocket.
- [4] As such, a knock and a gear, which are used as such a typical pen-tip actuating apparatus of a writing instrument. Such a knock-type writing instrument typically includes a knock and a gear, which are formed in a central shaft of the interior of a case of the knock-type writing instrument. Therefore, a separate space for the knock and the gear is required within the interior of the case so that the length of the case is too long and the width thereof is too wide.
- [5] Accordingly, there is 'Safety Knock Type Writing Instrument' which is disclosed in Korea patent publication NO. 2005-0019285 and had been filed on March 3, 2005. The disclosed safety knock type writing instrument includes a semi-gear part, which is rotatably assembled with a clip and inserted into the interior of the case, a knock part formed at one end of the case so as to perform a pen-tip pressing operation, and two protruding portions formed at an outer surface of the knock part while having different heights so as to perform a relate operation respective to the semi-gear part. While the knock part is moved according to a push operation performed by a user, the two protruding portions move along a groove of the semi-gear. As a result, one of the protruding portions is locked in the groove of the semi-gear so that an exposed state of a pen-tip is maintained, or the protruding portions are disconnected from the semi-gear so that the pen-tip is retracted into the interior of the case.
- [6] That is, according to the conventional safety knock type writing instrument, the semi-gear part for implementing a pen-tip actuating apparatus performs a relate

movement respective to the two protruding portions so as to maintain or release the exposed state of the pen-tip.

- [7] However, in such safety knock type instrument, in order to allow the pen-tip actuating apparatus to be properly operated, the two protruding portions have to be accurately formed while having heights different from each other, and grooves of the semi-gear part have to be formed at a desired angle and a desired depth. Therefore, it is difficult to accurately manufacture such a semi-gear part and protruding portions, and an erroneous operation can be performed.
- [8] Meanwhile, in the field of writing instruments using liquid ink or semi-liquid ink, writing instruments including a drying preventing apparatus for preventing the drying of ink and protecting a pen-tip have been recently developed.
- [9] As a conventional technique for preventing the drying of a pen-tip and protecting the pen-tip, 'Capless Writing Instrument' is disclosed in Japan Patent Laid-Open Publication No. 318693, which had been filed on December 3, 1996. The capless writing instrument includes a guide tube, through which a pen-tip extends, installed at a front interior part of a case in such a manner that an opening of the guide tube is opened and closed while a seal lid positioned at one end of the guide tube is rotated.
- [10] According to the conventional capless writing instrument structured as described above, when the pen-tip slides toward an inlet of the case due to a push operation, one end of the pen-tip fixed in a front part of the refill forcibly pushes the seal lid so as to be exposed. Meanwhile, when the pen-tip is retracted due to operation of a spring so as to be inserted into the interior of the guide tube, the seal lid automatically rotates due to a wire connecting the seal lid with the pen-tip so as to close the opening of the guide tube so that the pen-tip can be kept in the interior of the case. Therefore, the conventional capless writing instrument can prevent the drying of ink.
- [11] However, the conventional capless writing instrument has a structure where the pen-tip makes contact with the inner surface of the seal lid when the pen-tip is exposed. Therefore, when the capless wiring instrument is used for a long period of time, an end of the pen-tip is easily deteriorated so that the life span of the pen-tip is reduced, and ink in the seal lid leaks out.
- [12] Also, in the conventional capless instrument, the seal lid has a large size and a large radius of rotation so that the volume of a space between a front part of the guide tube and the inlet of the case is large. Therefore, the entire length of the case becomes longer, and thus it is difficult to implement a writing instrument having a compact structure.
- [13] In addition, pen-tip actuating writing instruments including various drying preventing apparatuses have been developed, and most of these apparatuses have a structure where a pen-tip makes contact with an inner surface of a seal lid for closing/

opening an inlet of a case so that the pen-tip appearing writing instruments have the same problem as the conventional capless writing instrument. Also, in a case of the pen-tip appearing writing instruments having a structure where a pen-tip is drawn in or out in a non-contact manner, the structure is complicated and the number of components is high. Therefore, it is difficult to put the pen-tip appearing writing instrument into practical use.

Disclosure of Invention

Technical Problem

[14] The present invention has been made in view of the above-mentioned problems, and the present invention provides a writing instrument including a pen-tip actuating apparatus which has a simple structure and is easily manufactured so that the pen-tip actuating apparatus can accurately perform an operation of drawing in or out a pen-tip.

[15] Also, the present invention provides a writing instrument, in which a pen-tip is exposed in a non-contact manner, an operation for keeping an airtight state of a case can be performed due to a simple structure and a small number of components without a need of a large amount of space at an inlet of the case, and a drying preventing apparatus, which can be easily manufactured, is included.

Technical Solution

[16] In accordance with an aspect of the present invention, there is provided a writing instrument including: a case having an inlet, through which a pen-tip is drawn in or out, formed at a front part of the case; a refill movably disposed at an interior of the case; a spring elastically supporting the refill respective to the case; a clip fixed to an exterior of the case so as to be clipped with a pocket, etc.; a knocking part moving frontward and backward along a rear side of the case so as to allow the refill to be moved; a clip gear rotatably installed at the clip so as to be positioned in a passing hole formed at one side surface of the case; and one protuberance extending from the knocking part and or from an outer surface of the refill so as to perform relative movement respective to the clip gear through the passing hole of the case, wherein a first guide groove, which is formed on an outer circumferential surface of the clip gear in such a manner that the first guide groove extends from a rear side to a front side of the clip gear while having a predetermined depth, a locking recess, which is formed at a rear side of a front part of the first guide groove while having a depth deeper than the depth the first guide groove, a second guide groove, which is formed at one side of the locking recess in such a manner that the second guide groove extends frontward in a predetermined distance while having a depth which is deeper than or equal to the depth of the locking recess, and a third guide groove, which extends from the second guide groove to a rear end of the first guide groove while having a depth which gradually

becomes shallower, are integrally connected with each other so that a circulating path is formed, wherein the protuberance sequentially circulates along the first guide groove, the second guide groove, and the third guide groove according to a movement of the knocking part.

Advantageous Effects

[17] According to the present invention, one protuberance moves along a circular path formed by a guide groove and a locking recess, which are formed at a clip gear while having each predetermined depth, so as to fix or release the location of a pen-tip. Therefore, the structure and the operation of a pen-tip actuating apparatus of a writing instrument are simplified, the operation of drawing in or out the pen-tip can be steadily and accurately performed, and it is easy to manufacture the present invention.

[18] Also, in a writing instrument, which further includes a drying preventing apparatus, according to an embodiment of the present invention, a pen-tip is exposed and an airtight state of a case is maintained in a non-contact manner that an opening/closing plate and a pen-tip do not make contact with each other. Therefore, even if the writing instrument is used for a long period of time, it is possible to prevent the opening/closing plate from being smeared with ink, and damage of the pen-tip is prevented. Therefore, there is an advantage in that the life span of the writing instrument can be extended.

Brief Description of the Drawings

[19] The foregoing and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

[20] FIG. 1 is a sectional view of a writing instrument including a pen-tip actuating apparatus according to an embodiment of the present invention;

[21] FIG. 2 is an exploded perspective view of the writing instrument of FIG. 1;

[22] FIG. 3 is a plane view of the writing instrument of FIG. 1;

[23] FIGs. 4a, 4b, and 4c are views sequentially illustrating a pen-tip drawing in-out operation of a writing instrument according to the present invention, in which a pen-tip is exposed out of a case and is fixed;

[24] FIGs. 5a, 5b, and 5c are views sequentially illustrating a pen-tip retracting operation of a writing instrument according to the present invention, in which a pen-tip is retracted into the interior of a case;

[25] FIG. 6 is an exploded perspective view of a writing instrument according to another embodiment of the present invention;

[26] FIGs. 7 and 8 are sectional views of a main part of the writing instrument of FIG. 6, in which an operation of a drying preventing apparatus is performed; and

[27] FIG. 9 is a perspective view illustrating an operational state of a drying preventing apparatus of the writing instrument of FIG. 6.

Mode for the Invention

[28] Hereinafter, exemplary embodiments of the present invention will be described with reference to the accompanying drawings.

[29] FIG. 1 is a sectional view of a writing instrument including a pen-tip actuating apparatus according to an embodiment of the present invention, and FIG. 2 is an exploded perspective view of the writing instrument of FIG. 1. The writing instrument according to the present invention includes a case 10, a refill 20, a knocking part 30, a spring 25, a clip 40, and a clip gear 50 and a protuberance 32, which are included in a pen-tip actuating apparatus.

[30] The case 10 has a cylindrical shape which is a long hollow tube, and includes a pen-tip inlet 11 formed at a front part of the case 10 so as to allow an end of the refill 20 to be drawn out, and the knocking part 30 installed in such a manner that the knocking part 30 is exposed out of the case.

[31] Also, a front stepped portion 13 supporting a front part of the spring 25 is formed at the front part of the case 10, and a passing hole is formed at a position of one side surface of the case 10, which corresponds to one end of the clip 40.

[32] Then, a rear stepped portion 21 supporting a rear part of the spring 25 is formed at a front side of the refill 21.

[33] The knocking part 30 has a cylindrical hollow- shape having an opened front part and a closed rear part so that a rear part of the refill 20 is inserted into the interior of the knocking part 30 through the opened front part of the knocking part 30. Also, the protuberance 32, which performs a relative movement respective to the clip gear 50 through the passing hole 12 of the case 10, is integrally formed at an outer circumferential surface of the knocking part 30.

[34] The clip 40 can be screw-assembled with the rear part of the case 10, and also can be assembled therewith in a hook type. Also, a supporting part 42, into which both ends of a hinge shaft 52 of the clip gear 50 are rotatably inserted, is integrally formed at an end part of the clip 40.

[35] As shown in FIG.3, the clip gear 50 has a body part 51 having a roughly semi-circular shape or a fan-shape having an angle (e.g. 120 degrees) smaller than an angle of a semi-circle. A hinge shaft 52, which is rotatably inserted into the supporting part 42 of the clip 40, is formed at a surface of the body part in such a manner that both ends of the hinge shaft extend from both ends of the body part 51, respectively, in a co-axial direction. Also, a circulating path is formed on an outer circumferential surface, which is formed by a first guide groove 53 extending from a rear side to a front side

while having a predetermined depth, a locking recess 54 formed at a rear side of a front part of the first guide groove 53 while having a depth deeper than the first guide groove 53, a second guide groove 55 extending from one side of the locking recess 54 frontward at a predetermined distance while having a depth deeper than or equal to the depth of the locking recess 54, and a third guide groove 56 extending from the second guide groove 55 to the rear part of the first guide groove 53 while having a depth which becomes gradually shallower.

[36] Herein, in order to achieve an easier understanding, the terms of the second guide groove 55 and the third guide groove 56 are used differently. However, as shown in FIG. 3, the second guide groove 55 and the third guide groove 56 can be substantially formed as one integral groove.

[37] Also, the first guide groove 53 is opened to the outside in such a manner that the protuberance 32 can enter from the exterior of the first guide groove 53 and escape from an interior of the clip gear 50 to the exterior thereof. As such, when the first guide groove 53 has a rear part opened outward so as to allow the protuberance 32 to enter or escape in inner and outer directions of the clip gear 50, the clip gear 50 can be employed regardless of a stroke distance of the pen-tip of the writing instrument. Therefore, one type clip gear can be employed in various types of writing instruments without a need for manufacturing each type clip gear suitable for various types of writing instruments.

[38] In order to allow the protuberance 32 to smoothly and easily enter the inside of the first guide groove 53, it is preferable that a taper part 58 is formed at a rear part of the first guide groove 53 while being slanted downward from a front side to a rear side thereof.

[39] Also, the body part 51 of the clip gear 50 having a roughly semi-circular shape is illustrated. However, its shape does not need to be a complete semi-circle, and it is preferable that the body part 51 has a shape near to a semi-circle.

[40] The operation of the writing instrument structured as described above will be described below.

[41] When the user presses the knocking part 30 of the writing instrument, the knocking part 30 and the refill 20 assembled with the knocking part 30 moves frontward while overcoming elastic force of the spring 25.

[42] As shown in FIG. 4a, the protuberance 32 of the knocking part 30 (see Fig. 1) moves along the knocking part 30 in a front direction. At this time, as shown in FIG. 4b, the protuberance 32 enters from an outside of the clip gear 50 to an inside of the first guide groove 53 so as to approach a curved part of the first guide groove 53, which is positioned at a left side based on the drawing, so that the clip gear 50 is rotated in a left direction based on the drawing. Then, the protuberance 32 approaches

a curved part of a right side of a front part of the first guide groove 53 so that the clip gear 50 is again rotated in a right direction.

[43] At this time, the end of the refill 20(see FIG. 1) is drawn out of the pen-tip inlet 11 (see FIG. 1) of the case 10 (see FIG. 1).

[44] Then, when the user removes pushing force exerted on the knocking part 30, the knocking part 30 and the refill 20 are moved backward by elastic force of the spring 25. Accordingly, as shown in FIG. 4c, the protuberance 32 is locked into the locking recess 54, and the knocking part 30 and the refill 20 cannot move backward anymore and are stably supported at a current position. Therefore, the user can write by using the writing instrument in this state.

[45] Then, in a case where the user wants to allow the end of the refill 20 to be retracted into the interior of the case 10, when the user pushes the knocking part 30 again, as shown in FIG. 5a, the knocking part 30 and the protuberance 32 move frontward and make contact with a stepped portion formed between the locking recess 54 and the first guide groove 53. Accordingly, the clip gear 50 rotates in a right direction based on the drawing so that the protuberance 32 is located at a front part of the second guide groove 55 as shown in FIG. 5b. Then, when the user removes or lessens pushing force exerted on the knocking part 30, the refill 20 and the knocking part 30 are pushed backward by elastic force of the spring 25.

[46] Therefore, the protuberance 32 moves backward along the second guide groove 55, and the clip gear 50 rotates a left direction based on the drawing.

[47] When the protuberance 32 completely escapes from the second guide groove 55, the protuberance 32 again moves in a direction of the first guide groove 53, and then moves to an outside of the rear part of the clip gear 50 so as to return to the initial position.

[48] As described above, due to pushing operation of the knocking part 30 and an elastic force of the spring 25, the protuberance 32 circulates at 360 degrees while sequentially passing the first guide groove 53, the locking recess 54, the second guide groove 55, and the third guide groove 56 so as to rotate the clip gear 50 in both directions. Due to relative operation respective to the clip gear 50, the protuberance 32 maintains the exposed state of the end of the refill 20 or allows the end of the refill 20 to be automatically retracted into the case.

[49] Meanwhile, in the writing instrument according to the present invention, the clip gear 50 is not installed at the interior of the case 10, but is disposed at one end of the clip 40. Therefore, it is possible to reduce the length and thickness of the case 10, and when the user clips the writing instrument to a pocket in a state where the end of the refill 20 is exposed, the refill 20 can be automatically retracted into the interior of the case 10 in such a manner that the clip gear 50 and the protuberance 32 are dis-

assembled from each other.

[50] That is, in a state where the end of the refill 20 is exposed to the exterior of the case 10, as shown in FIG. 4c, the protuberance 32 of the knocking part 30 is locked into the locking recess 54 of the clip gear 50 so that the state of the protuberance 32 being supported is maintained. At this time, when the user inserts cloth of a pocket, etc. between the clip 40 and the case 10, the protuberance 32 is disassembled from the clip gear 50. Accordingly, the protuberance 32 is not supported by any supporting object and becomes in a free state. The refill 20 and the knocking part 30 move backward due to elastic force of the spring 25 so that the end of the refill 20 is automatically retracted into the case 10.

[51] According to the present invention, one protuberance sequentially moves along the guide groove and the locking recess, which are formed on the clip gear while having each predetermined depth, so as to fix or release the location of the pen-tip. Therefore, the structure and operation of the pen-tip actuating apparatus is simplified, the operation of drawing in or out the pen-tip can be steadily and accurately performed, and the writing instrument can be easily manufactured.

[52] Also, the clip gear is formed at one end of the clip. Therefore, it is possible to reduce the length and thickness of the case, and when the user clips the writing instrument in a state where the end of the refill is exposed, the pen-tip actuating apparatus is operated so as to allow the end of the refill to automatically disappear into the case so that it is possible to prevent user's clothing from being smeared with ink.

[53] Next, with reference to FIGs. 6 to 9, a writing instrument according to another embodiment of the present invention will be described.

[54] As shown in FIGs. 6 and 7, the writing instrument according to the embodiment includes a case 110, a refill 120, a knocking part 130, a clip gear 170, a spring 140, a guide member 151 included in a dry preventing apparatus, a pair of opening/closing plates 152 and 153, a holder 155, and a plurality of operation strips 156. In this embodiment, structures and operations of the clip 160, the clip gear 170, and the knocking part 130 are equal to the operations of the clip 40 (see FIG. 1), the clip gear 50(see FIG. 1), and the knocking part 30(see FIG. 1), so description of them will be omitted.

[55] The case 110 has a cylindrical shape of a long hollow tube, and has a pen-tip inlet 111, through which a pen-tip 123 is drawn in or out, extending through a front part of the case and a knocking part 130 installed at a rear part of the case 110 in such a manner that the knocking part 130 is exposed.

[56] Also, the refill 120 includes an ink filling part 121, in which ink has been filled, and a pen-tip fixing part 122, in which the refill is inserted and fixed. The ink filling part 121 has a diameter larger than a diameter of the pen-tip fixing part 122, and a stepped

part 125 is formed between the ink filling part 121 and the pen-tip fixing part 122.

[57] The pen-tip 123 is installed in such a manner that the pen-tip can be exposed out of the pen-tip fixing part 122.

[58] Then, the spring 140 is inserted into the pen-tip fixing part 122 of the refill 120 so that one end of the spring 140 is supported by the stepped part 125 of the refill 120 and the other end thereof is supported by the guide member 151 of the drying preventing apparatus. Therefore, the spring 140 elastically supports the refill 120 respective to the case 110.

[59] The guide member 151 is made from flexible material such as rubber, etc. and is fixedly assembled with a front part of the case 110. Also, a through hole 151a allowing the pen-tip 123 to move therein is formed at the guide member 151 while extending in an axial direction of the guide member 151.

[60] The pair of opening/closing plates 152 and 153 are integrally formed at a front part of the guide member 151 in such a manner that they can rotate, the opening/closing plates 152 and 153 have sizes suitable for opening and closing one half of the through hole 151a, respectively. Therefore, entire size and a radius of rotation of the opening/closing plates 152 and 153 are smaller in comparison with a case where one opening/closing plate of a conventional type is formed.

[61] Also, the holder 155 has a rough ring-shape so that the holder 155 is inserted into the case through the pen-tip fixing part 122 of the refill 120 and is supported by the stepped part 125. The holder 155 is connected with two operation strips 156 connected with both sides of each opening/closing plates 152 and 153. Each operation strip 156 can be formed integrally with the holder 155, and can be also formed as a separate element so as to be assembled with the holder 155 in such a manner that each operation strip 156 is fixedly inserted into a corresponding groove formed on the holder 155.

[62] Each operation strip 156 is made from flexible resin such as plastic and has a pre-determined size so as to secure enough strength to push the opening/closing plates 152 and 153 when the holder 155 is moved due to movement of the refill 120.

[63] Each operation strip 156 is fixed to the opening/closing plates 152 and 153 while having a width variable at a portion where the operation strip 156 is connected with the opening/closing plates 152 and 153. In more detail, a part of each operation strip 156, which is inserted into each groove 152a and 153a formed at both ends of each opening/closing plate 152 and 153, has a narrower width in comparison with a part of each operation strip 156, which is connected from the holder 155 to the opening/closing plates 152 and 153. Therefore, each stepped portion 156 is formed at a portion where each operation strip 156 is connected with the opening/closing plates 152 and 153.

[64] Therefore, as shown in FIGs. 8 and 9, when force is exerted on the operation strips 156 due to movement of the holder 155 in a front direction, the opening/ closing plates

152 and 153 are rotated while being pushed frontward by each stepped portion 156a of the operation strips 156. Accordingly, the opening/closing plates 152 and 153 allow the through hole 151a of the guide member 151 to be opened in a state where the pen-tip 123 of one end of the refill 120 does not make contact with the opening/closing plates 152 and 153.

[65] Meanwhile, in this embodiment, two operation strips 156 are installed at the holder 155 so that one operation strip 156 is connected with both ends of each opening/closing plate 152 and 153. However, differently to the embodiment, four operation strips 156 can be connected with the holder 155 so that two operation strips are connected with both ends of each opening/closing plates 152 and 153, respectively.

[66] The operation of the writing instrument according to the present invention, which is structured as described above, will be described below.

[67] When the user do not want to use the writing instrument, as shown in FIG. 7, a state where the pen-tip 123 being completely inserted into the interior of the case 110 is maintained.

[68] When the user pushes the knocking part 130 positioned as the rear part of the case 110 in order to use the writing instrument, the refill 120 moves frontward while overcoming elastic force of the spring 140 as shown in FIG. 8.

[69] At this time, as described above, the holder 155 fixed in the refill 120 and the operation strips 156 are moved frontward due to frontward movement of the refill 120, and before the pen-tip 123 makes contact with the opening/closing plates 152 and 153, the opening/closing plates 152 and 153 rotates while being pushed by each stepped portion 156a of the operation strips 156 so that the through hole 151a of the guide member 151 is opened.

[70] In this state, when the refill 120 further moves frontward, the state of the opening/closing plates 152 and 153 being opened is maintained while the operation strip 156 are elastically changed, the pen-tip 123 is exposed via the through hole 151a of the guide member 151 and the pen-tip inlet 111 of the case 110.

[71] When the pen-tip 123 is completely exposed to an outside, the protuberance 131 of the knocking part 130 is supported in such a manner that the protuberance 131 is locked into the clip gear 170 so that the refill 120 is restricted in a current location, and the user can write with the writing instrument.

[72] After the user finishes writing, when the user pushes the knocking part 130, the protuberance 131 of the knocking part 130 is released from the clip gear 170 so that the refill 120 moves backward due to elastic force of the spring 140.

[73] As such, while the refill 120 moves in a rear direction, the holder 155 fixed to the refill 120 moves along with the refill 120 in the rear direction. Therefore, the pen-tip 123 moves backward within the through hole 151a of the guide member 151, and the

operation strips 156 simultaneously pull opening/closing plates 152 and 153. Accordingly, the opening/closing plates 152 and 153 are rotated in an opposite direction so that the through hole 151a of the guide member 151 is closed.

[74] Therefore, when the pen-tip 123 is completely retracted into the interior of the case 110, the state where the interior of the case 110 is completely closed by the guide member 151 and the opening/closing plates 152 and 153 is maintained so that it is possible to completely prevent air from flowing in or out the case 110 and to prevent ink from drying through the pen-tip 23.

[75] According to this second embodiment, without contact between the opening/closing plates and the pen-tip, the pen-tip can be exposed and an airtight state of the case can be maintained in a non-contact manner. Therefore, it is possible to prevent the opening/closing plates from being smeared with ink and prevent deterioration of the pen-tip so that the life span of the pen-tip can be extended.

[76] Also, two separate opening/closing plates, which are formed in such a manner that one opening closing plate is divided into two parts, open and close the through hole of the guide part. As a result, the entire size and a radius of rotation of the opening/closing plates can be smaller in comparison with one opening/closing plate in an integral shape. Therefore, the size of the front part of the case can be reduced while considering the radius of rotation of the opening/closing plates so that utility of space increases and a writing instrument having a compact size can be implemented.

Industrial Applicability

[77] The present invention can be employed in the field of writing instruments

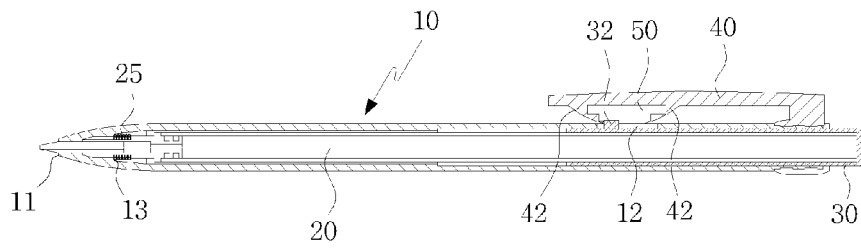
Claims

- [1] A writing instrument comprising:
a case having an inlet, through which a pen-tip is drawn in or out, formed at a front part of the case;
a refill movably disposed at an interior of the case;
a spring elastically supporting the refill respective to the case;
a clip fixed to an exterior of the case so as to be clipped with a pocket, etc.;
a knocking part moving frontward and backward along a rear side of the case so as to allow the refill to be moved;
a clip gear rotatably installed at the clip so as to be positioned in a passing hole formed at one side surface of the case; and
one protuberance extending from the knocking part and or from an outer surface of the refill so as to perform relative movement respective to the clip gear through the passing hole of the case,
wherein a first guide groove, which is formed on an outer circumferential surface of the clip gear in such a manner that the first guide groove extends from a rear side to a front side of the clip gear while having a predetermined depth, a locking recess, which is formed at a rear side of a front part of the first guide groove while having a depth deeper than the depth the first guide groove, a second guide groove, which is formed at one side of the locking recess in such a manner that the second guide groove extends frontward in a predetermined distance while having a depth which is deeper than or equal to the depth of the locking recess, and a third guide groove, which extends from the second guide groove to a rear end of the first guide groove while having a depth which gradually becomes shallower, are integrally connected with each other so that a circulating path is formed, and the rear end of the first guide groove is opened to an outside of the clip gear so as to allow the protuberance to enter from the outside of the clip gear or to escape from an inside of the clip gear to the outside of the clip gear,
wherein the protuberance sequentially circulates along the first guide groove, the second guide groove, and the third guide groove according to a movement of the knocking part.
- [2] The writing instrument claimed in claim 1, wherein the clip gear has a semi-circle-shape section or a fan-shape section having a smaller angle in comparison with a semi-circle.
- [3] The writing instrument claimed in claim 1, wherein a taper part is formed at the rear end of the first guide groove while being slanted downward from a front side to a rear side of the taper part so as to allow the protuberance to easily enter into

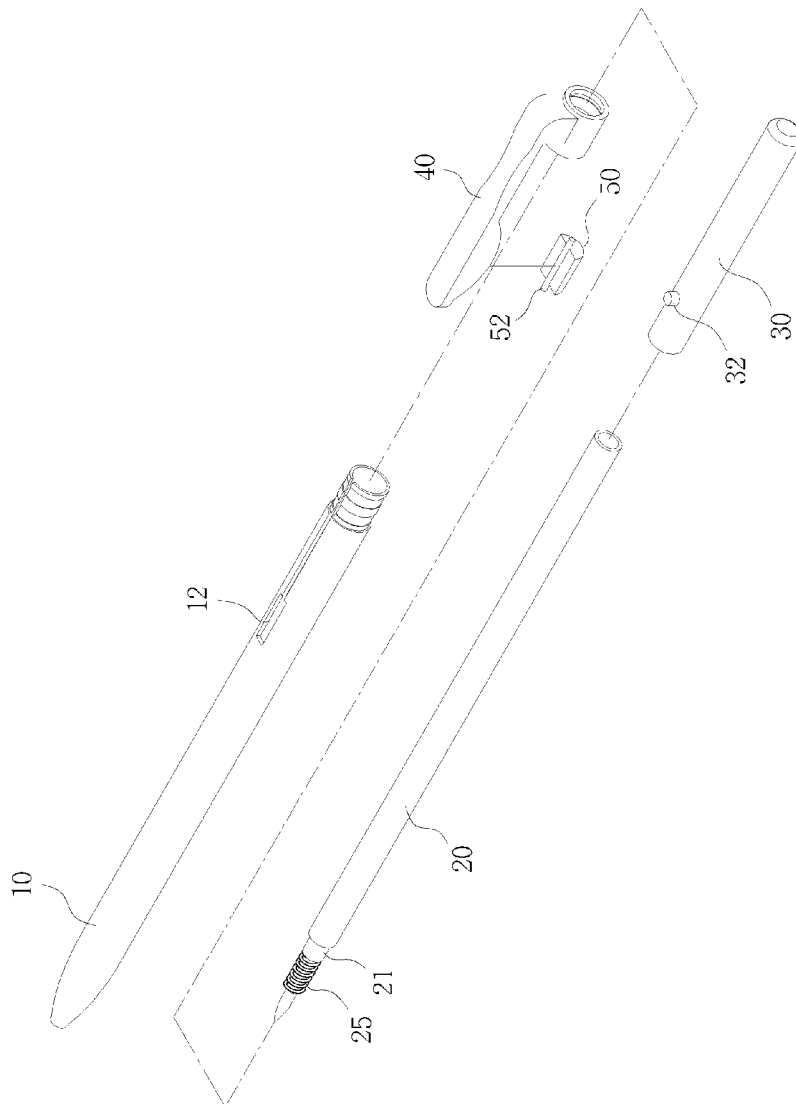
or escape from the first guide groove.

- [4] The writing instrument claimed in claim 1, further comprising:
a guide member which is fixed to an inside of the inlet of the case and has a through hole, the pen-tip passing into and moving within the through hole;
a pair of opening/closing plates which are rotatably formed at one end of the guide member and open/close each half part of the through hole due to a rotational movement; and
an opening/closing plate operating unit which has one side fixed to the pen-tip and another side connected with the pair of opening/closing plates so that the opening/closing plate operating unit directly pushes and pulls each opening/closing plate so as to open and close the through hole of the guide member when the pen-tip moves frontward and backward.
- [5] The writing instrument claimed in claim 4, wherein the opening/closing plate operating unit includes a holder fixed to the pen-tip and a plurality of operating strips which has one end fixed to the holder and another end fixedly connected with both ends of the pair of opening/closing plates, and also includes stepped portions formed at each portion where the operation strips are connected with the opening/closing plates so that the opening/closing plates rotates while being pushed by the stepped portions so as to open the through hole when the holder moves frontward due to a frontward movement of the pen-tip.
- [6] The writing instrument claimed in claim 5, wherein each operating strip is fixedly inserted into each groove formed at the both ends of each opening/closing plate, and each stepped portion is formed at a portion where each operating strip is inserted into the corresponding groove.

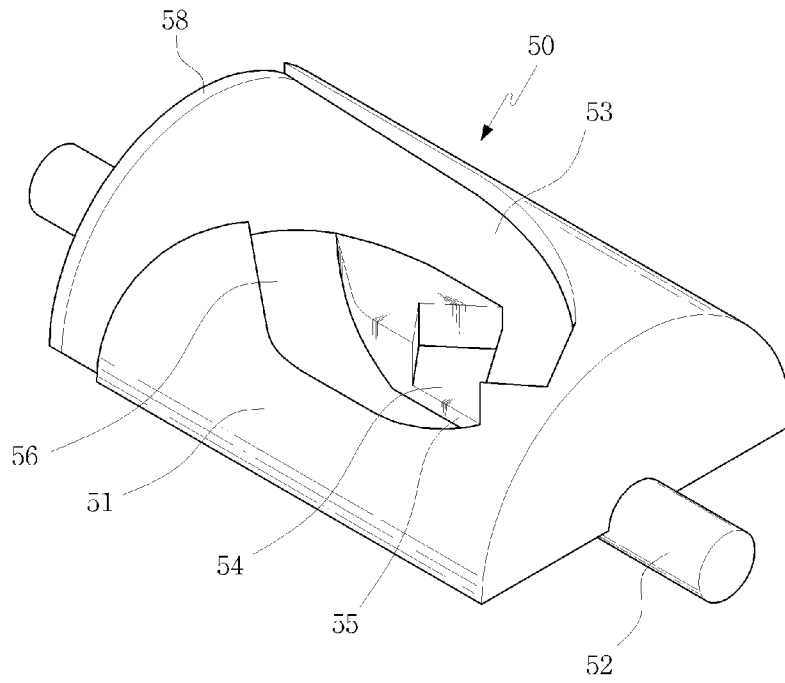
[Fig. 1]



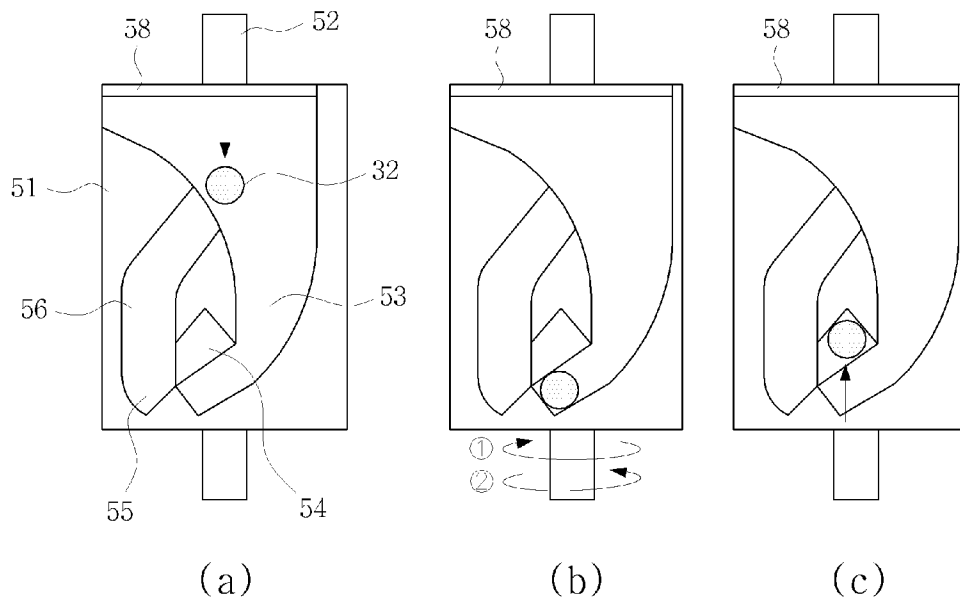
[Fig. 2]



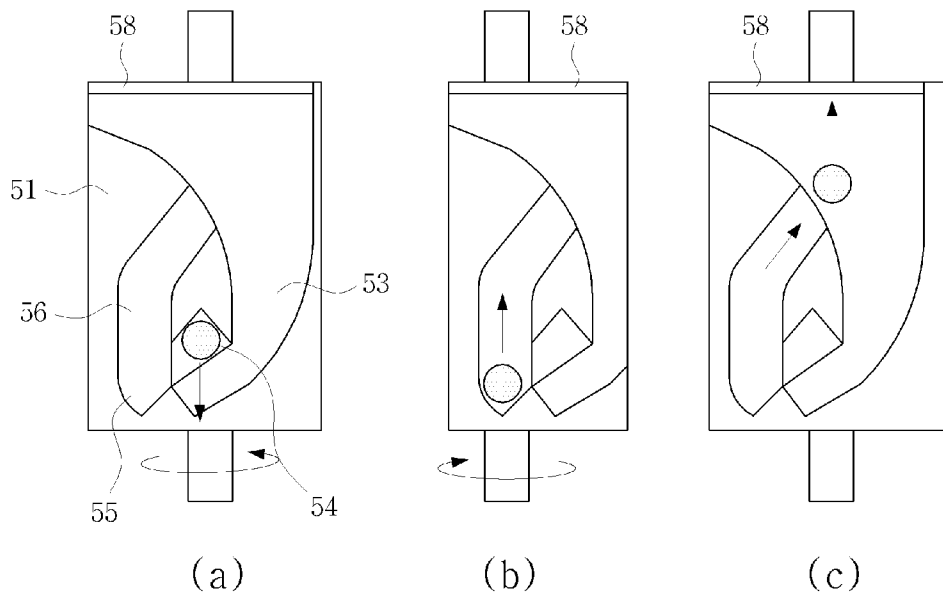
[Fig. 3]



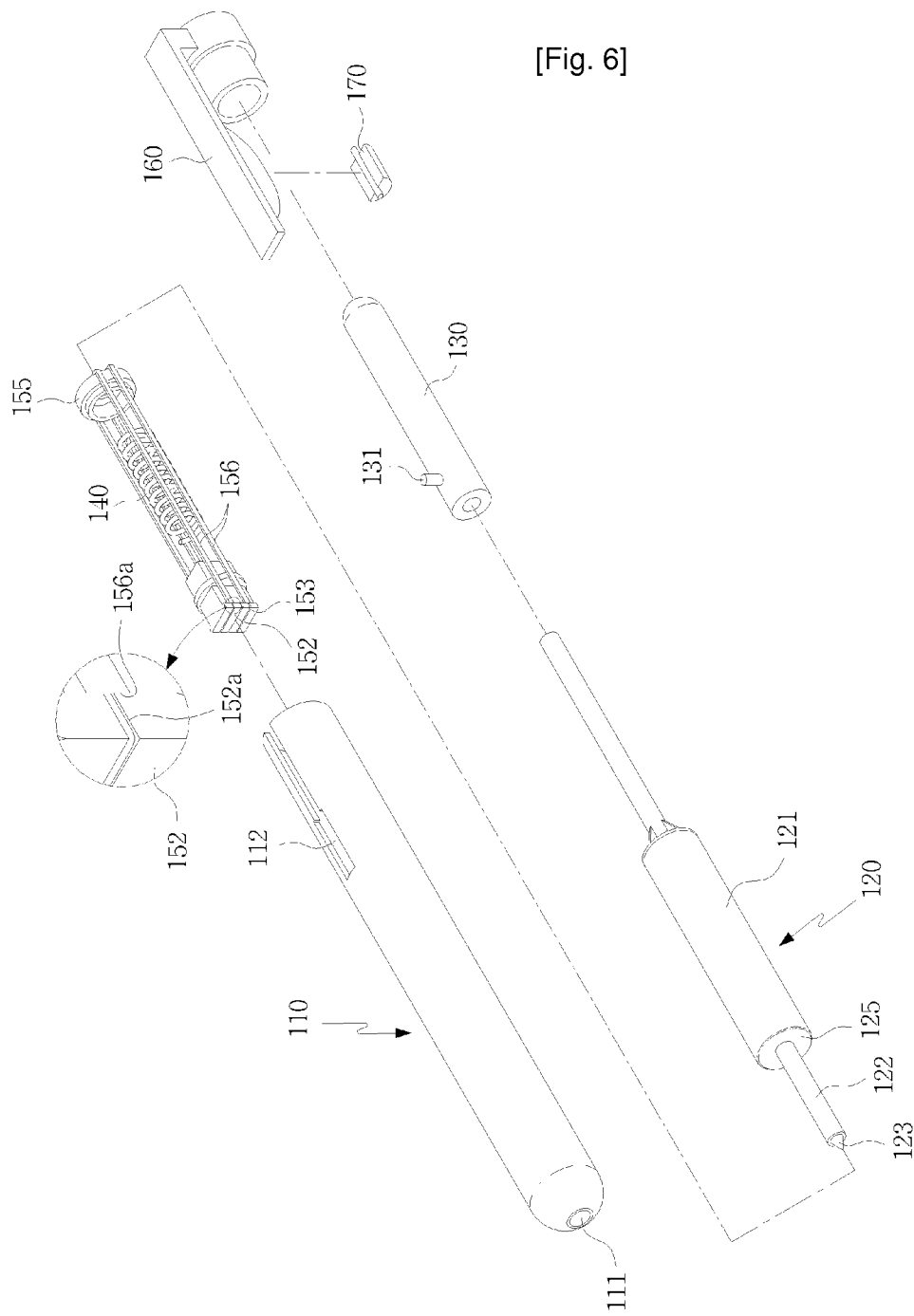
[Fig. 4]



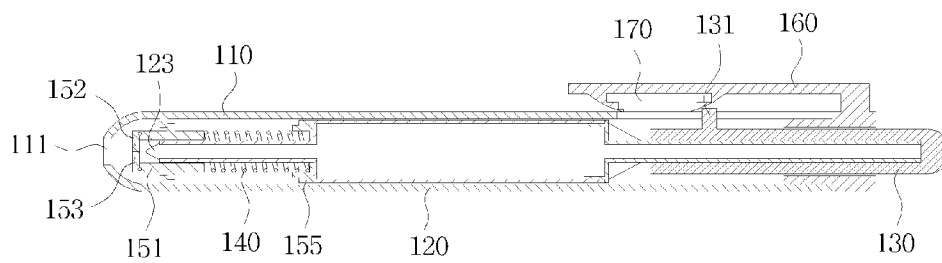
[Fig. 5]



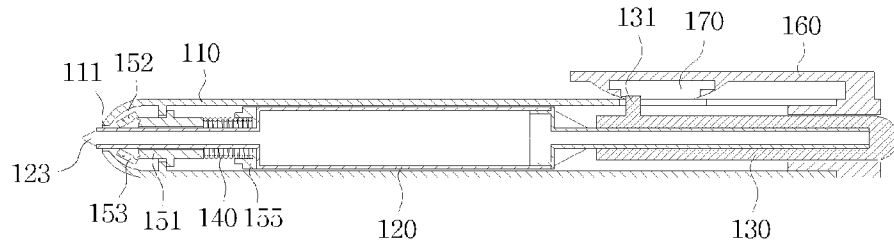
[Fig. 6]



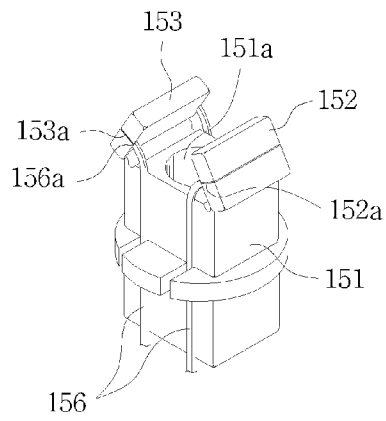
[Fig. 7]



[Fig. 8]



[Fig. 9]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/001980**A. CLASSIFICATION OF SUBJECT MATTER****B43K 24/00(2006.01)i**

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)

IPC 8: B43K 24/00 B43K 24/06

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

Korean Utility Models and Applications for Utility Models since 1975

Japanese Utility Models and Applications for Utility Models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internal) & Keywords: writing instrument, pen, nib, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2006-0101031 A (MORRIS Co., Ltd.) 22 September 2006 See Figure 2, Claims 1-5 and Detailed Description	1-6
A	JP 62-028590 U (ANKOS Co., Ltd.) 20 February 1987 See Figure 7 and Claim 1.	1-6
A	JP 60-184687 U (PILOT Co., Ltd.) 07 December 1985 See Figure 2 and Claim 1.	1-6

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

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/001980

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2006-0101031 A	22.09.2006	None	
JP 62-028590 U	20.02.1987	None	
JP 60-184687 U	07.12.1985	None	