

PATENT SPECIFICATION

685,706



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COMPLETE SPECIFICATION

Improvements in and relating to Ball Point Pens

We, THE ECLIPSE FOUNTAIN PEN AND PENCIL COMPANY LIMITED, a company duly incorporated under the Joint Companies' Act of the Province of Ontario and having its principal place of business at 140, Kendal Avenue, in the City of Toronto, County of York, Province of Ontario, Canada, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to ball point pens and in particular, mechanism for projecting and retracting the writing tip relatively to the barrel or holder.

It is well known to provide a ball point pen in which the ball point tip of the pen may be projected from the barrel to writing position and retracted into the barrel when the pen is not in use. The present invention provides a pen of this character made up of few parts and applying a particularly simple mechanism for projecting or retracting the ball point. It also permits easy removal and replacement of refills.

According to the invention, a ball point pen comprises an open ended barrel, and a refill unit with a writing tip projectable through the lower open end of said barrel, the sides of said barrel being formed with longitudinally extending slots, trunnions carried by said refill unit for engaging said longitudinally extending slots, an actuating sleeve carried by said barrel for rotation thereabout and formed with inclined slots, said trunnions engaging said inclined slots of said actuating sleeve, means for rotating said actuating sleeve whereby the writing tip of said cartridge is caused to move in and out of the lower open end of said barrel, the interior of said barrel being formed with a shoulder, said refill unit being provided with a shoulder and a compression spring, said spring being compressed between said

shoulder on the interior of said barrel and said shoulder on said refill unit.

Preferably, the refill unit has a cross head formed thereon, said trunnions extending from said cross head, said cross head comprising said shoulder.

The invention will be fully understood by reference to the following detailed specification taken in conjunction with the accompanying drawings.

In the drawings:—

Figure 1 is a perspective view of a barrel or body for a ball pen.

Figure 2 is a perspective view of a refill unit including the ball tip designed for mounting in the barrel.

Figure 3 is a perspective illustration of a cap for the pen.

Figure 4 is a perspective illustration of an actuating sleeve for use in projecting or retracting refill units relatively to the barrel, and

Figures 5, 6 and 7 are enlarged fragmentary illustrations of the pen barrel with the several parts of Figures 1 to 4 assembled and the cap partially removed to illustrate various positions of the refill unit from retracted to projected position as the cap is rotated.

Referring to the drawings, A indicates a ball pen barrel according to the present invention, B indicates a refill unit which unit is hereinafter referred to as a refill. C indicates a pen cap, and D indicates an actuating sleeve functioning to cause the ball tip of the refill B to move between retracted and projected position relatively to the barrel and *vice versa*.

The pen barrel A is of conventional form being a hollow cylinder tapered at its lower end as at 10 and which may terminate with the frustro-conical metal ferrule 11. The lower end is open and through which the ball tip 12 of the refill unit B may be projected and retracted as shown generally in Figures 5 to 7.

The upper end of the barrel is provided with a tubular, preferably metal extension

13 which is fixed with the barrel, the extension being provided with the diametrically opposed longitudinal slots 14 and 15, the slot 14 intersecting the upper edge 16 of the extension to provide the re-entrant opening 17 for the easy insertion of a refill for the pen. The open-ended slot 14 also permits the extension 13 to yield slightly and assist in the smooth operation of projecting and retracting the pen tip by permitting ready rotation of the pen cap as will appear hereinafter.

The refill unit B includes the conical tip 12 terminating in the writing ball 18 which tip is mounted on the tubular shank 19 containing the writing material. Adjacent the upper end of the shank 19 a cross-head 20 is secured which may be cylindrical in character as shown and bored transversely to receive the shank therethrough. From the cross-head 20 the trunnions 21 and 22 project.

The refill B is passed into the barrel A in such a manner that the trunnions 21 and 22 enter into the slots 14 and 15 respectively and the refill may be caused to move axially in the barrel from the position shown in Figure 5 to the position shown in Figure 7 and *vice versa*. This is achieved through the actuating sleeve D which is a split sleeve, being split longitudinally as at 23. It is provided with the symmetrical inclined slots 24 and 25 respectively formed in directly opposite sides of the sleeve and in such a manner that inclined slot 24 is inclined in a direction opposite to the direction of incline of the slot 25. Each end of the slots 24 and 25 terminate in sockets 26 and 27 which are designed for locking the trunnions 21 and 22 in relation to the fully projected and fully retracted positions of the ball tip 18 as will be apparent hereinafter.

The extension 13 of the barrel A is of a diameter substantially coinciding with the internal diameter of the barrel A but at its upper end is increased in thickness as at 28 substantially to correspond with the internal diameter of the cap C. The actuating sleeve D has an internal diameter substantially coinciding with the external diameter of the extension 13 between the barrel and the thickened end 28 and an external diameter substantially coinciding with that of the thickened portion 28. It is easily slipped over the extension 28 particularly by reason of the split 23 and the trunnions 21 and 22 of the refill B projecting through the opposed longitudinal slots 14 and 15 of the extension 13 are each readily also located in the opposed inclined slots 24 and 25 of the sleeve, as these trunnions are long enough to project through the slots 14 and 15 as well as to enter into the inclined slots 24 and 25 when

the sleeve D is placed on the extension 13. Preferably, however, they should not be long enough in effect to pass wholly through the slots 24 and 25 as it is preferable that they do not engage the inner wall of the cap.

When the cap C is mounted in place on the extension 13 so that its lower end abuts the upper end 29 of the barrel A the inner wall of the cap will frictionally engage the actuating sleeve D and to some extent will also frictionally engage the thickened end 28 of the extension 13. However, by reason of the fact that the thickened end is of small area and is somewhat resilient because of open ended slot 14 and also by reason of the fact that extension 13 is fixed with the barrel A it will be obvious that if the cap C is rotated in one direction or the other it will rotate relatively to the extension 13 but the freely mounted actuating sleeve D will rotate with it. Therefore, it will also be obvious that the refill B will be moved axially in the barrel downwardly or upwardly as the case may be to project the ball tip 18 from the lower end of the barrel or to retract it from the projected position. In this connection, reference is made to Figures 5, 6 and 7 wherein it will be noted in the case of Figure 5 that the refill is in the fully retracted position and the trunnions 21 and 22 will be located in the sockets 26 at the upper end of the inclined slots 24 and 25. As the pen cap is rotated from right to left, i.e. as indicated by the directional arrow 30, it will be seen that the inclined slots function in the manner of a cam track, as the actuating sleeve D rotates, so that the inclined upper edge of each of these inclined slots presses against the trunnions forcing them to move downwardly in the longitudinal slots 14 and 15 of the extension 13. The tip of the refill, therefore, begins to project through the open lower end of the barrel until it is fully projected when the trunnions reach the lower ends of the inclined slots 24 and 25 and enter into the terminal sockets 27 of these slots as illustrated in Figure 7. Conversely, when the cap C is then rotated from left to right the lower edge of the slots 24 and 25 will engage the trunnions and force them to move upwardly in the longitudinal slots 14 and 15 of the extension 13 until they reach the terminal sockets 26 at the top of the inclined slots as shown in Figure 5 thereby fully retracting the tip of the refill from the projected position shown in Figure 7.

The above described mechanism preferably includes a coil spring 31 mounted on the shank 19 to maintain the trunnions in operative engagement with the edges of the inclined slots 24 and 25 as it eliminates

a precision relation between the slots 24 and 25 and the width of the trunnion, to provide for a construction which can be manufactured with greater economy.

5 This is of particular importance in an article of this kind where refills are replaced from time to time and the spring will function to maintain the trunnions in the terminal sockets of the inclined slots when

10 the tip is in its retracted or projected position and in particular functions to maintain the tip against axial play when the tip is projected and is being used for writing. In this connection, as shown

15 particularly in Figure 5, the lower end of the spring 31 is designed to abut the annular shoulder 32 formed in the interior of the barrel and the upper end of the spring is designed to abut the lower surface

20 of the cross-head 20 so that the spring is under compression. Therefore, the cross-head is subjected to the compressive force of the spring when it is in its retracted position and the movement of the refill

25 from the retracted to the projected position slightly increases the compression of the spring such that the projected tip is held firmly in its projected position for writing purposes. Any other suitable means, of

30 course, might be employed for engaging either end of the spring to maintain it under compression.

The refill is very rapidly inserted or removed as will be apparent from the

35 foregoing description and it is notable that the actuating sleeve is truly symmetrical in all respects so that it does not matter which end is fitted on the pen first. Therefore, it is not necessary for the operator

40 to determine which end should go on but this can be placed on automatically.

From the foregoing it will be apparent that we have provided a ball point pen having a retractable tip embodying the

45 use of but few and simple parts which is capable of economical manufacture and through which the ball tip may be projected and retracted in a simple positive action controlled by the rotation of the

50 cap.

What we claim is :—

1. A ball point pen comprising an

open ended barrel and a refill unit with a writing tip projectable through the lower open end of said barrel, the sides of said barrel being formed with longitudinally extending slots, trunnions carried by said refill unit engaging said longitudinally extending slots, an actuating sleeve carried by said barrel for rotation thereabout and formed with inclined slots, said trunnions engaging said inclined slots of said actuating sleeve and means for rotating said actuating sleeve whereby the writing tip of said refill unit is caused to move in and out of the lower open end of said barrel, the interior of said barrel being formed with a shoulder, said refill unit being provided with a shoulder and a compression spring, said spring being compressed between said shoulder on the interior of said barrel and said shoulder on said refill unit.

2. A ball point pen as claimed in claim 1, in which said refill unit has a cross head formed thereon, said trunnions extending from said cross head, said cross head comprising said shoulder.

3. A ball point pen as claimed in claim 1, in which said compression spring is a coil spring.

4. A ball point pen as claimed in claim 1, in which the upper portion of said barrel member is of less diameter than the lower portion of said barrel, said longitudinal slots being formed in said upper portion of said barrel and in which said actuating sleeve fits over said upper portion of said barrel, said sleeve being provided with a cap member that frictionally engages therewith whereby rotation of the cap and consequent rotation of the sleeve in one direction or the other will project or retract respectively the refill unit.

5. A ball point pen as claimed in claim 1, in which said inclined slots terminate in sockets.

6. A ball point pen substantially as hereinbefore described with reference to the accompanying drawings.

H. D. FITZPATRICK & CO.,

Chartered Patent Agents,
94, Hope Street, Glasgow, C.2, and
27, Chancery Lane, London, W.C.2.

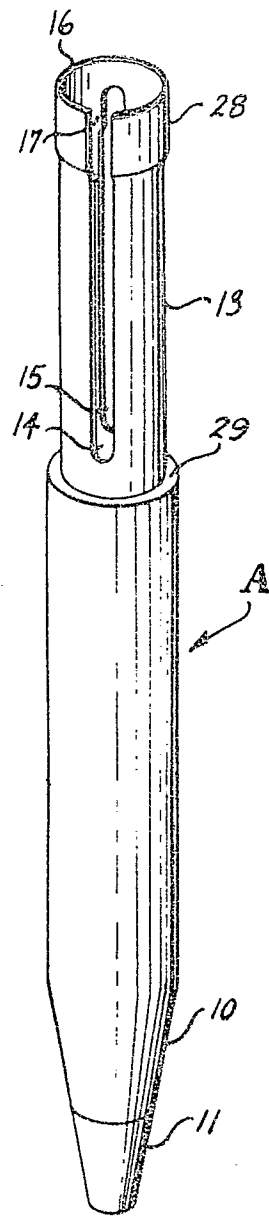


Fig. 1

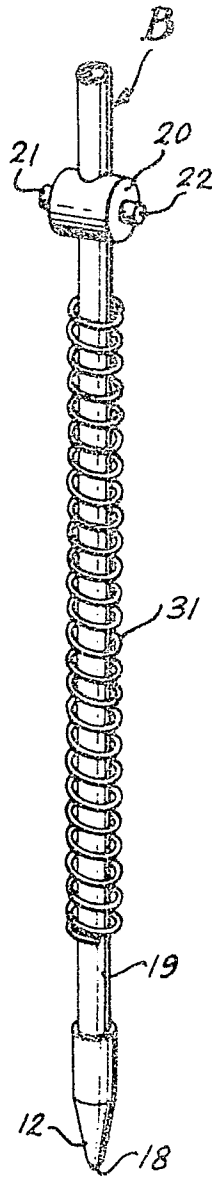


Fig. 2

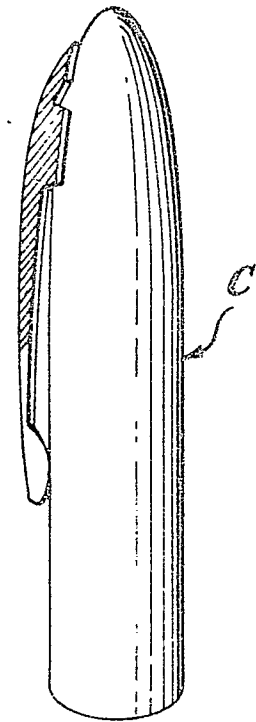


Fig. 3

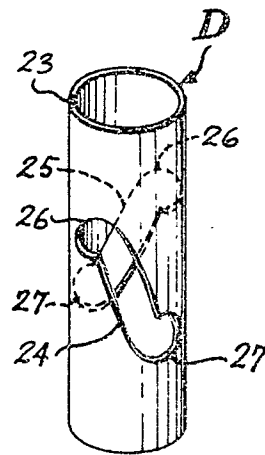


Fig. 4

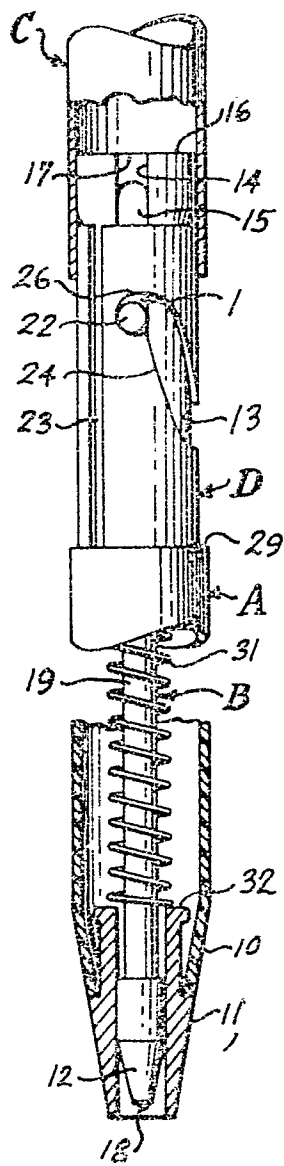
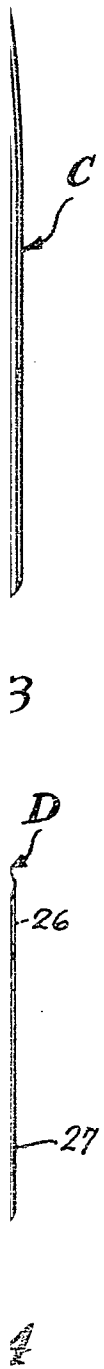


Fig. 5

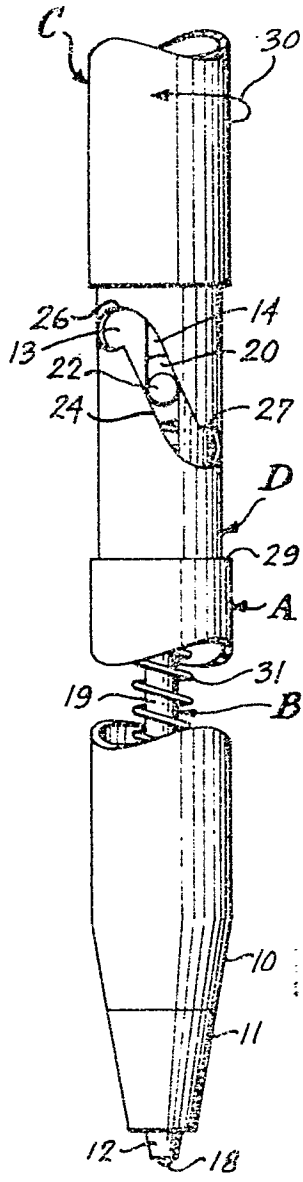


Fig. 6

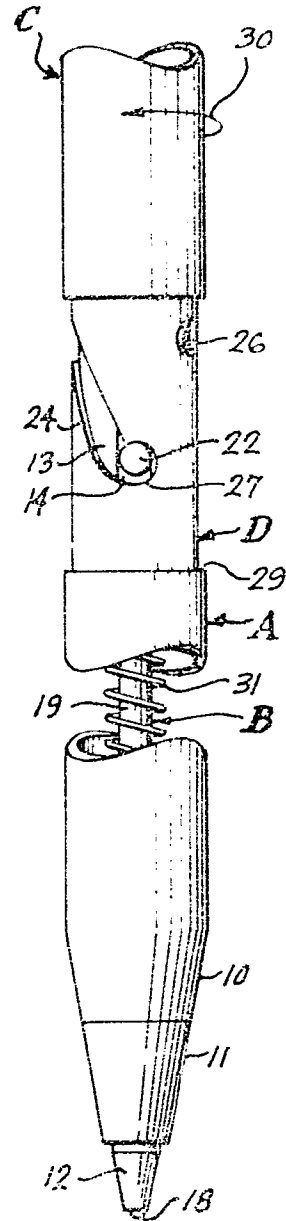


Fig. 7

655 706 COMPLETE SPECIFICATION
 2 SHEETS
 This drawing is a reproduction of
 the Original on a reduced scale.
 SHEETS 1 & 2

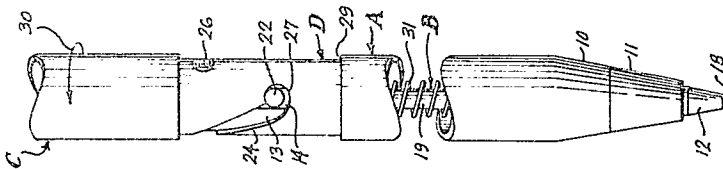


Fig. 1

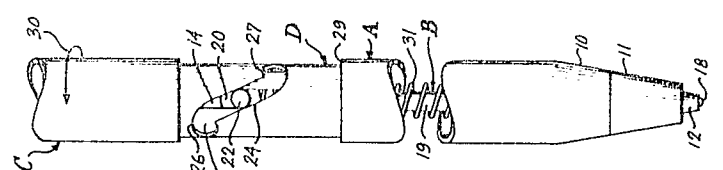


Fig. 2

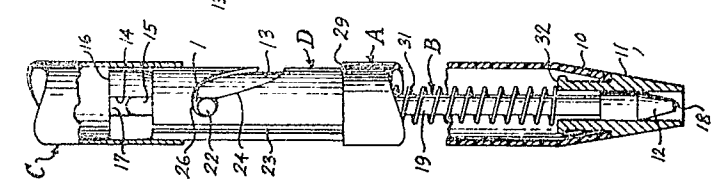


Fig. 3



Fig. 4

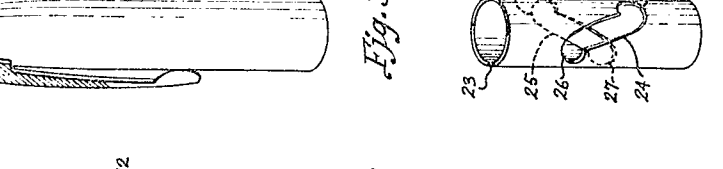


Fig. 5

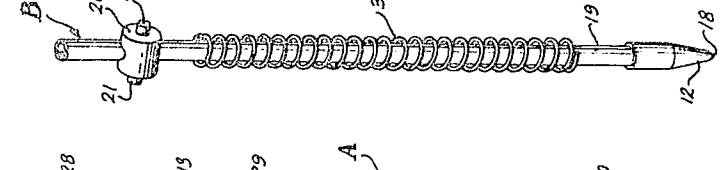


Fig. 6

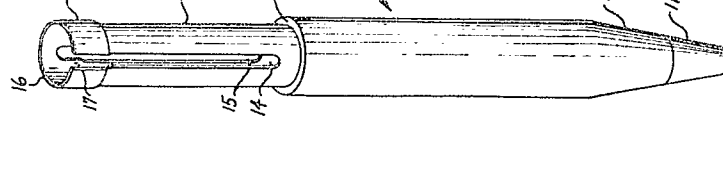


Fig. 7