

PATENT SPECIFICATION

(11) 1 507 351

1 507 351

- (21) Application No. 18990/75 (22) Filed 6 May 1975
(31) Convention Application No. 468 559
(32) Filed 9 May 1974 in
(33) United States of America (US)
(44) Complete Specification published 12 April 1978
(51) INT CL³ B43K 24/02, 7/12
(52) Index at acceptance B6P 11R1D 11R1Y



(54) RETRACTABLE BALL POINT PEN

(71) We, K. C. PEN CO., INC., a Corporation organised and existing under the laws of the State of New York, United States of America, of 175 Pearl Street, Brooklyn, State of New York 11201, United States of America, 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:—

The present invention relates generally to writing implements and particularly to a retractable, replaceable cartridge ball point pen in which the advance and retraction of the writing element is effected by the simple manipulation of a clip member carried by the writing implement.

There are many types of propel-repel mechanisms employed and proposed for use in the advance and retraction of the writing element in ball point pens but these have been generally of a complex nature or difficult and inconvenient to operate and frequently unreliable. Among such propel-repel mechanisms which have heretofore been available or proposed is a type in which the advance of the writing element to its extended position is effected by the radial inward depression of a clip member carried by the pen. While such an arrangement is highly convenient, previous proposals for a mechanism for producing this function possess numerous drawbacks and disadvantages. It is generally complex, inconvenient to employ, or little reliability and commonly subject to malfunctioning and damage and otherwise leaving much to be desired.

According to the present invention, there is provided a retractable writing implement comprising a barrel member; an elongated writing element disposed in the barrel member and longitudinally movable between a retracted position and an advanced position in which it projects through the bottom of the barrel member; means for resiliently urging said writing element toward its retracted

position; a follower member longitudinally slidably disposed in the upper part of the barrel member and in engagement with the upper part of the writing element, the barrel member having a first opening therein registering with the follower member and a second opening above the first opening; and clip member rockably disposed adjacent the exterior of the upper part of the barrel member and comprising upper and lower arms and an inwardly directed bracket between said upper and lower arms, said bracket projecting through the second opening in the barrel member and being rockably connected to the follower member to permit rocking of said clip member relative thereto about an axis extending transverse the axis of the barrel member, the upper and lower arms of the clip member extending respectively above and below said transverse axis, the clip member lower arm having a cam at its lower end registering with the first opening and provided with an inwardly and upwardly inclined downwardly facing cam surface which engages an upwardly facing portion of the follower member, whereby rocking of the clip member about said transverse axis so that the lower arm of the clip member moves inwardly effects downward movement of the follower member and moving element and the outward swinging of the upper arm to an outwardly extended position until the writing element is in its advanced position, and the rocking of the clip member about said transverse axis so that the upper arm moves inwardly from its extended position causes the lower arm to swing outwardly and allow the follower member and writing element to move upwardly until the writing element is in its retracted position.

Where the writing implement is a replaceable cartridge ball point pen of the cartridge propel-repel type, the invention provides a pen in which the ball point is inherently withdrawn before the pen can be clipped in a pocket.

A writing implement according to the

invention has the advantage that it affords reliability, ruggedness, ease and convenience of operation, simplicity and low cost and high versatility and adaptability.

5 In a preferred embodiment of the writing implement, the follower member is provided at its upper part with laterally axially aligned opposite pivot projections having with outwardly converging end
10 faces, and a depending transversely offset pair of parallel transversely spaced arms joined by a bottom ledge projecting transversely toward the barrel opening. Preferably the clip member includes a pair
15 of laterally spaced bracket plates having inclined longitudinal slots slidably and pivotably engaged by the pivot elements and the cam engages the upper face of the follower bottom ledge. The writing element
20 is preferably inclined to the longitudinal axis of the barrel member between the follower spaced arms and engages a downwardly facing surface at the upper part of the follower.

25 Reference is hereinafter made to the accompanying drawings which illustrate an embodiment of the invention by way of example, and of which:

30 Figure 1 is an exploded perspective view of a ball point pen according to the present invention;

Figure 2 is a medial longitudinal sectional view of the assembled pen shown in a retracted condition;

35 Figure 2A is a view similar to Figure 2 but showing the pen in an advanced condition;

Figure 3 is a sectional view taken along line 3—3 in Figure 2;

40 Figure 4 is a sectional view taken along line 4—4 in Figure 2; and

Figure 5 is a sectional view taken along line 5—5 in Figure 2.

In the drawings, a replaceable cartridge ball point pen 10 comprises a hollow
45 elongated barrel 11 formed of metal or other suitable material. The barrel 11 includes separable upper and lower coaxial end-to-end sections 12 and 13 respectively, which are separably joined by a stepped
50 collar 14 having upper and lower portions of reduced and increased diameter respectively, delineated by a peripheral shoulder.

55 The barrel lower section 13 is provided with a conical bottom portion 16 tapering to a restricted end opening 17 at the tip thereof. The barrel upper section 12 is provided with a conical top portion 18 terminating in a closed end wall 19. Formed
60 in the wall of the barrel top section 12 and extending longitudinally from the base of conical portion 18 is a relatively short first rectangular opening or slot 20. A second relatively long rectangular opening or slot
65 21 is formed in upper barrel section 12 in

longitudinal alignment with the first slot 20 and extending from a point below the bottom edge of the first slot 20 to a point above the bottom edge of the barrel section 12.

70 Longitudinally slidably registering with and engaging the interior face of the upper cylindrical portion of barrel section 12 is a follower 22 which is advantageously
75 integrally moulded as a unit of a synthetic organic polymeric resin. The follower 22 includes an upper narrow block section 23, which extends diametrically across the barrel section 12 at about the level of slot 20 and has a cylindrical vertical end face 24,
80 which confronts the slot 20 and is substantially coplanar with the interior cylindrical face of barrel section 12. The vertical end face of block section 23 opposite to face 24 does not reach the wall
85 of barrel section 12.

The block section 23 has parallel vertical side faces 26, which are formed, proximate the upper inner corners thereof, a pair of laterally coaxially aligned slide pivot
90 defining projections 27 of cylindrical configuration. The half 28 of the outer end face of each pivot 27 remote from face 24 is parallel to the faces 26 and the opposite half
95 29 of the outer end face of each pivot proximate the face 24 is inclined from the raised end face half 28 toward faces 24 and 26 and reaches at its medial portion the respective face 26. Medially depending from
100 the block section 23 is an approximately cubic shaped section 30 having bevelled vertical edges 32 which slidably engage the interior cylindrical edges 32 which slidably engage the interior cylindrical face of barrel
105 section 12. The vertical front face 33 of section 30 is spaced inwardly of the cylindrical face 24 of block section 23.

A pair of laterally spaced parallel vertical arms 34 depend from the follower section
110 30. A rectangular recess 36 is medially formed in the lower rear corner of section 30 and has side faces 37 which are coplanar with the inside faces 38 of arms 34, an inner vertical face 39 which is coplanar with the front faces 40 of arms 34, and a downwardly
115 directed horizontal top face 41 aligned with the space between arms 34. Formed at the lower front faces 40 of arms 34 and connecting the arms 34 is a forwardly projecting horizontal ledge 42 having
120 bevelled vertical corners 43 slidably engaging the barrel wall interior face. The outer vertical edges of arms 34 are likewise so bevelled. The ledge 42 has a horizontal top face 44 and, formed in its front face, a
125 forwardly projecting medial wide rib 46 coextensive in height with ledge 42 and registering with the slot 21. Formed along the upper front edge of rib 46 is an upwardly directed laterally extending lip 47.
130

A clip 48, formed of metal or other suitable material, is pivotably mounted on the upper part of the pen 10, and comprises a normally vertical, relatively long lower arm 49, a normally upwardly, inwardly inclined, relatively short upper arm 50 and a rearwardly projecting bracket 51 between the arms 49 and 50. The bracket 51 includes a pair of laterally spaced rearwardly projecting parallel vertical plates 52 which are coplanar with flanges 53 formed along the edges of lower arm 49. Plates 52 have formed therein transversely aligned, upwardly and rearwardly inclined parallel slots 54. The bracket plates 52 project through barrel slot 20 and embrace follower section 23 with the slots 24 slidably and pivotably engaging the pivots 27. The inclined faces 29 of pivot 27 facilitate the assembly of the clip 48, follower 22 and barrel section 12.

Formed at the lower end of arm 49 is an inwardly projecting cam member 56 having an upwardly inwardly inclined bottom cam face 57 which projects through the bottom portion of slot 21 and engages the follower lip 47. It should be noted that when the arm 49 is in its depressed or inner advanced position, as shown in Figure 2A, the bottom apex 58 of cam 56 engages the ledge top face 44 immediately inwardly of lip 47 and the arm 50 diverges upwardly from the face of barrel section 18, and when the arm 53 is in its outer or retracted position, as shown in Figure 2, the upper border of cam surface 57 engages the follower lip 47 and the arm 50 lies along the surface of barrel conical section 18.

Replaceably housed in the barrel 11 is a writing element 59 which comprises a ball point cartridge of conventional construction and which extends from proximate the end opening 17 at an angle, which is slightly inclined to the barrel axis, upwardly between the arms 34 of follower 22, into the follower recess 36 and into engagement with the recess top face 41. Ears 60 are formed on the lower part of cartridge 59 and the cartridge terminates at its bottom in a ball point member 61 of reduced cross section which is aligned with opening 17. A helical spring 65 engages the cartridge 59 and is entrapped between the ears 60 and the inside face of the lower barrel section 16 so as to resiliently urge the cartridge 59 and thus the follower 22 also to their raised retracted positions with the ball point member 61 fully drawn into the barrel tapered portion 16, as shown in Figure 2.

Considering now the operation of the writing implement 10, when the cartridge 59 is in its spring biased, retracted position, as shown in Figure 2, the upper arm 50 rests on the surface of barrel section 18 and the lower arm 49 is retracted with the upper

border of cam face 57 of cam 56 engaging the follower lip 47 to release the follower and cartridge to their raised retracted positions under the influence of spring 65. To advance the cartridge 59, the lower clip arm 49 is pressed inwardly to advance cam face 57 along follower lip 47 thus advancing the follower 22 which in turn protracts the cartridge to its fully advanced position with writing element 61 projecting through tip opening 17, fully loading the spring 65. In the fully depressed position of arm 49 the cam apex 58 rests on follower ledge face 41 immediately inwardly of lip 47 to lock the follower 22 releasably in its depressed position. With the full inward depression of lower clip arm 49, the upper arm 50 is swung away from the surface of barrel portion 18 and the bracket slots 54 swing from their inclined positions to vertical positions as shown in Figure 2A.

To retract the cartridge 59 into the barrel, the upper arm 50 is merely pressed to swing it inwardly towards the face of barrel portion 18, thereby swinging the lower arm 49 outwardly so that the cam 56 allows the follower 22 to be moved upwardly by the spring-loaded cartridge 59. The writing implement thus returns to the "cartridge retracted" condition shown in Figure 2.

While collar 14 was shown illustratively as a stepped cylinder, its upper portion 15 may have at least three longitudinal ribs or splines on its outer diameter, shown in dotted lines at 15a, for aiding in the positioning of cap 12. Other means for separably joining cap 12 may be utilized, such as threads. Also, while follower 22 is illustrated as having been moulded from a plastics material, it may also advantageously be cast or moulded from a metal, such as zinc.

WHAT WE CLAIM IS:—

1. A retractable writing implement comprising a barrel member; an elongated writing element disposed in the barrel member and longitudinally movable between a retracted position and an advanced position in which it projects through the bottom of the barrel member; means for resiliently urging said writing element toward its retracted position; a follower member longitudinally slidably disposed in the upper part of the barrel member and in engagement with the upper part of the writing element, the barrel member having a first opening therein registering with the follower member and a second opening above the first opening; and a clip member rockably disposed adjacent the exterior of the upper part of the barrel member and comprising upper and lower arms and an inwardly directed bracket between said upper and lower arms, said bracket

13



* C L M S *

1,507,351

3

A clip 48, formed of metal or other suitable material, is pivotably mounted on the upper part of the pen 10, and comprises a normally vertical, relatively long lower arm 49, a normally upwardly, inwardly inclined, relatively short upper arm 50 and a rearwardly projecting bracket 51 between the arms 49 and 50. The bracket 51 includes a pair of laterally spaced rearwardly projecting parallel vertical plates 52 which are coplanar with flanges 53 formed along the edges of lower arm 49. Plates 52 have formed therein transversely aligned, upwardly and rearwardly inclined parallel slots 54. The bracket plates 52 project through barrel slot 20 and embrace follower section 23 with the slots 24 slidably and pivotably engaging the pivots 27. The inclined faces 29 of pivot 27 facilitate the assembly of the clip 48, follower 22 and barrel section 12.

Formed at the lower end of arm 49 is an inwardly projecting cam member 56 having an upwardly inwardly inclined bottom cam face 57 which projects through the bottom portion of slot 21 and engages the follower lip 47. It should be noted that when the arm 49 is in its depressed or inner advanced position, as shown in Figure 2A, the bottom apex 58 of cam 56 engages the ledge top face 44 immediately inwardly of lip 47 and the arm 50 diverges upwardly from the face of barrel section 18, and when the arm 53 is in its outer or retracted position, as shown in Figure 2, the upper border of cam surface 57 engages the follower lip 47 and the arm 50 lies along the surface of barrel conical section 18.

Replaceably housed in the barrel 11 is a writing element 59 which comprises a ball point cartridge of conventional construction and which extends from proximate the end opening 17 at an angle, which is slightly inclined to the barrel axis, upwardly between the arms 34 of follower 22, into the follower recess 36 and into engagement with the recess top face 41. Bars 60 are formed on the lower part of cartridge 59 and the cartridge terminates at its bottom in a ball point member 61 of reduced cross section which is aligned with opening 17. A helical spring 65 engages the cartridge 59 and is entrapped between the ears 60 and the inside face of the lower barrel section 16 so as to resiliently urge the cartridge 59 and thus the follower 22 also to their raised retracted positions with the ball point member 61 fully drawn into the barrel tapered portion 16, as shown in Figure 2.

Considering now the operation of the writing implement 10, when the cartridge 59 is in its spring biased, retracted position, as shown in Figure 2, the upper arm 50 rests on the surface of barrel section 18 and the lower arm 49 is retracted with the upper

border of cam face 57 of cam 56 engaging the follower lip 47 to release the follower and cartridge to their raised retracted positions under the influence of spring 65. To advance the cartridge 59, the lower clip arm 49 is pressed inwardly to advance cam face 57 along follower lip 47 thus advancing the follower 22 which in turn protracts the cartridge to its fully advanced position with writing element 61 projecting through tip opening 17, fully loading the spring 65. In the fully depressed position of arm 49 the cam apex 58 rests on follower ledge face 41 immediately inwardly of lip 47 to lock the follower 22 releasably in its depressed position. With the full inward depression of lower clip arm 49, the upper arm 50 is swung away from the surface of barrel portion 18 and the bracket slots 54 swing from their inclined positions to vertical positions as shown in Figure 2A.

To retract the cartridge 59 into the barrel, the upper arm 50 is merely pressed to swing it inwardly towards the face of barrel portion 18, thereby swinging the lower arm 49 outwardly so that the cam 56 allows the follower 22 to be moved upwardly by the spring-loaded cartridge 59. The writing implement thus returns to the "cartridge retracted" condition shown in Figure 2.

While collar 14 was shown illustratively as a stepped cylinder, its upper portion 15 may have at least three longitudinal ribs or splines on its outer diameter, shown in dotted lines at 15a, for aiding in the positioning of cap 12. Other means for separably joining cap 12 may be utilized, such as threads. Also, while follower 22 is illustrated as having been moulded from a plastics material, it may also advantageously be cast or moulded from a metal, such as zinc.

WHAT WE CLAIM IS:—

1. A retractable writing implement comprising a barrel member; an elongated writing element disposed in the barrel member and longitudinally movable between a retracted position and an advanced position in which it projects through the bottom of the barrel member; means for resiliently urging said writing element toward its retracted position; a follower member longitudinally slidably disposed in the upper part of the barrel member and in engagement with the upper part of the writing element, the barrel member having a first opening therein registering with the follower member and a second opening above the first opening; and a clip member rockably disposed adjacent the exterior of the upper part of the barrel member and comprising upper and lower arms and an inwardly directed bracket between said upper and lower arms, said bracket

(14)



projecting through the second opening in the barrel member and being rockably connected to the follower member to permit rocking of said clip member relative thereto about an axis extending transverse the axis of the barrel member, the upper and lower arms of the clip member extending respectively above and below said transverse axis, the clip member lower arm having a cam at its lower end registering with the first opening and provided with an inwardly and upwardly inclined downwardly facing cam surface which engages an upwardly facing portion of the follower member, whereby rocking of the clip member about said transverse axis so that the lower arm of the clip member moves inwardly effects downward movement of the follower member and writing element and the outward swinging of the upper arm to an outwardly extended position until the writing element is in its advanced position, and the rocking of the clip member about said transverse axis so that the upper arm moves inwardly from its extended position causes the lower arm to swing outwardly and allow the follower member and writing element to move upwardly until the writing element is in its retracted position.

2. A writing implement as claimed in claim 1, in which the writing element is inclined to the longitudinal axis of the barrel member and the follower member includes a downwardly facing surface bearing on the top of the writing element.

3. A writing implement as claimed in claim 1 or claim 2, in which the upper part of the barrel member is of conical configuration and the clip member upper arm in its inner position extends along the exterior surface of the barrel member upper part.

4. A writing implement as claimed in any of claims 1 to 3, in which the follower member has a pair of laterally aligned, oppositely projecting pivot elements, and the bracket includes a pair of laterally spaced parallel vertically extending slots which are slidably and pivotably engaged by the pivot elements.

5. A writing implement as claimed in claim 4, in which the slots are longitudinally oriented at an angle to the vertical when the lower arm is moved outwardly in its outer

and inner positions and become longitudinally vertically oriented when the lower arm is swung inwardly.

6. A writing element as claimed in claim 4 or claim 5, in which the pivot elements are integrally formed with the follower and include end faces having portions thereof proximate the first opening in said barrel member converging relative to each other toward the barrel member.

7. A writing implement as claimed in any of claims 4 to 6, in which the follower member comprises an integrally formed unit including a relatively thin upper section on opposite faces of which the pivot elements are positioned and a relatively wide section below the thin upper section and including a pair of laterally spaced depending parallel side arms joined at their bottoms by a horizontal ledge projecting toward the first opening and terminating in an upwardly extending projection which is engageable by the cam on the clip member.

8. A writing implement as claimed in any of claims 4 to 7, in which the bracket includes laterally spaced parallel plates aligned generally parallel to the longitudinal axis of the clip member, each of the plates containing one of the slots.

9. A writing implement as claimed in claim 7, in which the bracket includes laterally spaced parallel plates, each plate containing one of the slots, the plates embrace the thin section of said follower member, and the slots engage the pivot elements on the thin section.

10. A writing implement as claimed in claim 7 or claim 9, in which the writing element is disposed between the pair of laterally spaced depending parallel side arms of the follower member.

11. A retractable writing implement substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

12. A retractable replaceable cartridge ball point pen substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

K. C. PEN CO., INC.,
per Boulton, Wade & Tennant,
34 Cursitor Street,
London EC4A 1PQ,
Chartered Patent Agents.