

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN AND RELATING TO A WRITING INSTRUMENT

(71) We, CONWAY STEWART AND COMPANY LIMITED, a British Company, of 196 Great Cambridge Road, Enfield, Middlesex, 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 a writing instrument, such as a ball-point pen, of the kind in which the writing point is movable between a retracted position, in which the writing point is housed within the barrel of the instrument, and a projected position, in which the writing point projects from the forward end of the barrel.

The mechanism for retracting and projecting the pen point is of the type comprising a floating latch member which is displaceable axially against the action of a spring, by a depressible plunger, and during its axial movement also has imparted to it a transverse fulcrumed rocking movement, each successive depression of the plunger causing the latch member to rock transversely in a direction opposite to that caused by the preceding depression and in one axial position to engage a catch to retain the writing point in the projected position and in the other axial position to engage a catch to retain the writing point in the retracted position.

The object of the present invention is to provide an improved construction of latch mechanism of the type above described whereby manufacture and assembly is considerably simplified and cost of manufacture correspondingly reduced.

With this object in view the invention consists of a writing instrument comprising a floating latch member disposed in the barrel of said instrument, a depressible plunger for imparting axial movement to said latch member against the action of a spring, to project or retract the writing point of the instrument out of or into the barrel, and catch means for retaining said latch member in one of two axial positions corresponding

respectively to the projected or retracted position of said writing point, wherein said latch member is located in a sleeve member fitted in said barrel and is provided with a head portion having therein an annular undercut groove forming a hook part by means of which said latch member is adapted to latch onto catches formed in axially spaced relationship on the inner surface of said sleeve member, and wherein said latch member is provided in its head portion with a conical or concave recess in which the end of a spring loaded ink cartridge engages said latch member to impart transverse rocking or tilting movement thereto upon operation of the plunger, and said plunger is provided with a conical or concave recess in its inner end in which engages the end of the latch member remote from its head portion.

In order that the invention may be more clearly understood one particular embodiment thereof will now be described, by way of example, with reference to the accompanying drawings in which:—

Figure 1 is an axial section of the ball-point writing instrument provided with latch mechanism according to the invention;

Figure 2 is a section on the line II—II of Figure 3 of a sleeve member forming part of the latch mechanism;

Figure 3 is an end view of Figure 2 looking in the direction of arrow A;

Figure 4 is a cross-section on the line IV—IV of Figure 2;

Figure 5 is a section of the sleeve according to Figure 2 on the line V—V of Figure 3;

Figure 6 is a cross-section on the line VI—VI of Figure 5;

Figure 7 is a cross-section on the line VII—VII of Figure 5; and

Figure 8 is a part sectional elevation of the latch member.

Referring first to Figure 1 of the drawings the writing instrument, in the form of a ball-point pen, comprises a barrel which includes a front portion 9, for containing an ink cartridge 11 having a writing point 12, and a rear cap portion 10 screwed or otherwise

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attached to the front portion 9 and containing means for projecting or retracting the writing point 12. The writing point is normally urged to a retracted position by a helical spring 13. The means in the cap portion 10 of the instrument for projecting or retracting the writing point 12 comprises a manually operated plunger 14, a sleeve member 15 fitted into said cap portion 10 of the barrel and retained by a flange 24, and a latch member 16 located in said sleeve member 15 and movable by said plunger 14 against the action of the spring 13.

Referring now to Figures 2 to 7 of the drawings the sleeve member 15 consists of a generally cylindrical element having at one end an external annular retaining flange 24, providing a close frictional fit between said sleeve member and the rear cap portion 10, and at the opposite end, hereinafter referred to as the front end, an inwardly directed radial flange 17 and is provided on its inner wall surface on two diametrically opposite sides of the sleeve with longitudinal flats 18. At the end farthest from the front end of the sleeve each flat 18 is provided with a relatively shallow projection 19 extending radially inwards from the wall of the sleeve. The purpose of the projections 19 is to retain the latch member in the sleeve 15 during assembly of the writing instrument and thus facilitate assembly.

The inner wall of the sleeve is also provided with longitudinal thickened portions 20 and 21 extending from the front end of the sleeve, said thickened portions terminating at different distances from the front end of the sleeve in an undercut portion at the end facing the rear end of the sleeve to form catches 22 and 23 for retaining the latch member 16 in one of two different axial positions (see Figure 1) as and for the purpose hereinafter described. The catches 22 and 23 are spaced at equal distances circumferentially of the sleeve between the flats 18 and are arranged in spaced relationship relative to each other in the axial direction of the sleeve, the catch 22 being located towards the front end of the sleeve and the catch 23 nearer to the rear end of said sleeve, as clearly shown in Figure 2.

Referring now to Figure 8, the latch member 16 consists of a solid piece of circular cross-section and includes a shank portion 16a and a head portion 16b. The head portion is provided with a deep conical axial recess 16c and the end of the shank portion, at the end opposite to the head portion, is provided with a relatively shallow conical recess 16d. The shank portion 16a merges into the head portion 16b through an outwardly tapered portion 16e which forms one wall of an annular undercut groove 16g, of substantially V-shaped cross-section, between the shank portion and the

head portion, said groove forming a hook part 16k by means of which the latch member latches on to the catches 22 and 23 of the sleeve member (see Figure 1). The outer circumferential surface of the head member 16b includes a cylindrical component 16h and an inwardly tapering component 16j which merge into each other.

The plunger 14 (Figure 1) consists of a solid piece of circular cross-section having a shank portion 14a and a head portion 14b which is provided with a conical axial recess 14c in which the end of the shank portion of the latch member engages. The shank portion 14a of the plunger projects through an opening 10a in the outer end of the cap and the head portion is freely slidable in a part of the cap having an inner surface 10b of cylindrical cross-section.

Although the recesses 16c, 16d in the latch member and the recess 14c in the plunger 14 are described and illustrated as being conical it is to be understood that they could be concave or any other shape providing a side wall extending inwardly at an angle to the axis of said members and the terms conical and concave are to be understood as including such shapes.

The operation of the latch mechanism according to the invention will now be described with reference to Figure 1.

When the ink containing cartridge or reservoir 11 is in its retracted position, the parts 15 and 16 of the latch mechanism are in the positions shown in Figure 1 with the rear end of the ink cartridge bearing, under the action of the spring 13, against the latch member 16 at the point *a* thus causing said latch member to tilt into the position shown in full lines in Figure 1. When the plunger 14 is then depressed, to cause the writing point 12 of the pen to be projected from the front end of the barrel portion 9, the latch member 16 will be engaged by said plunger at the point *b* of said plunger, thus the force applied to the latch by the plunger against the action of spring 13, will be in the axial direction of the plunger, that is in the direction of arrow C, so that the latch will remain in the tilted position, and when the hook portion 16k of the latch member passes the catch 23 the latch member will drop into the position shown in broken lines in Figure 1, due to the spring biased ink cartridge bearing against the side of the latch at *a*, so that upon release of the plunger the hook portion 16k of the latch member 16 will engage the catch 23 to retain the writing point 12 in its projected position. As the hook portion 16k moves into position to engage the catch 23, the end of the ink cartridge 11 will be moved, under the action of spring 13, to a position in which it bears against the latch member 16 on the opposite side of the conical recess 16c, that is in the region *d*, whereby said

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latch member will be moved into the position shown in full lines in Figure 1, by releasing plunger 14.

5 Upon the next succeeding depression of the plunger to move the latch member out of engagement with the catch 23 the spring biased action of the ink cartridge on the latch member will cause said latch member to tilt into a position opposite to that shown in full lines in Figure 1 by virtue of the ink cartridge acting on the latch member at point *d*. Thus when the plunger 14 is released the latch member will engage the catch 22 and thereby be caused to tilt back into its initial position shown in full lines in Figure 1.

15 It is to be understood that by providing the head 14*b* of the plunger with a conical recess 14*c* and the latch member 16 with a conical recess 16*d* it is ensured that the point of contact between the plunger and the latch member, when said plunger is depressed, is such as to cause said latch member to be moved in the manner above described.

25 It is also to be understood that providing the head of the latch member with a conical recess 16*c* not only ensures that the point of contact between said latch member and the end of the ink cartridge is such as to ensure that the latch member is moved in the manner described but also ensures that in all relative positions of the latch member and the ink cartridge the air inlet to said cartridge is left open to permit free flow of ink when the pen is in use.

35 The latch mechanism according to the invention has the following important advantages over all known constructions of latch mechanisms.

40 (a) As the cap portion 10 of the pen does not include any part of the latch mechanism a standard form of cap and barrel portion can be used and said cap and barrel portion can be made from any plastics material including the cheapest grades.

45 (b) As the plunger 14, latch member 16 and the cap and barrel are symmetrical bodies of revolution they can be manufactured by moulding techniques which will allow automatic moulding with the greatest possible dimensional tolerances, and the minimum of tooling costs.

50 (c) The writing instrument, by virtue of the simplicity of the construction of the component parts, can be readily assembled by machines using the known forms of feeding mechanism, and furthermore manual assembly is considerably facilitated since, it being only necessary to drop the parts of the latch mechanism into the cap in the right order thus permitting assembly by unskilled labour.

60 (d) In view of the advantages mentioned in (a) to (c) above the cost of manufacture and assembly is considerably reduced as compared with the known construction of

writing instrument having similar retracting mechanism. 65

WHAT WE CLAIM IS:—

1. A writing instrument comprising a floating latch member disposed in the barrel of said instrument, a depressible plunger for imparting axial movement to said latch member against the action of a spring, to project or retract the writing point of the instrument out of or into the barrel, and catch means for retaining said latch member in one of two axial positions corresponding respectively to the projected or retracted position of said writing point, wherein said latch member is located in a sleeve member fitted in said barrel and is provided with a head portion having therein an annular undercut groove forming a hook part by means of which said latch member is adapted to latch onto catches formed in axially spaced relationship on the inner surface of said sleeve member and wherein said latch member is provided in its head portion with a conical or concave recess in which the end of a spring loaded ink cartridge engages said latch member to impart transverse rocking or tilting movement thereto upon operation of the plunger, and said plunger is provided with a conical or concave recess in its inner end in which engages the end of the latch member remote from its head portion. 70 75 80 85 90 95

2. A writing instrument according to claim 1, wherein said latch member is of solid circular cross-section.

3. A writing instrument according to claim 1 or 2, wherein said latch member is provided with a deep conical recess in the head portion and a relatively shallow conical recess in the end of a shank portion. 100

4. A writing instrument according to claim 1, 2 or 3, wherein said latch member comprises a shank portion which merges into the head portion through an outwardly tapering portion forming one surface of a substantially V-shaped groove forming said hook part. 105 110

5. A writing instrument according to any one of the preceding claims, wherein the outer circumferential surface of the head portion of said latch member has a cylindrical component and an inwardly tapering component. 115

6. A writing instrument according to any one of the preceding claims, wherein said sleeve member is provided at one end with an external annular flange by means of which it is retained in said barrel portion with a close frictional fit. 120

7. A writing instrument according to claim 6, wherein said sleeve member is provided at the end opposite said externally flanged end with an internal radial flange and is provided internally with two diametrically opposite flats provided at their inner ends with inwardly projecting radial projections. 125

8. A writing instrument according to claim 6 or 7, wherein said sleeve member is provided with longitudinal thickened portions extending from the internally flanged end of said sleeve and ending in undercut portions to form catches for the latch member.

9. A writing instrument according to claim 7 and 8, wherein said catches are spaced at equal distances circumferentially of said sleeve between said flats.

10. A writing instrument according to any one of the preceding claims, wherein said plunger consists of a solid piece of circular cross-section having a shank portion, projecting through an opening in the end of a cap portion of the barrel, and a head

portion provided with a conical axial recess in which engages the end of the shank of the latch member.

11. A writing instrument according to any one of the preceding claims, wherein the plunger, latch member and barrel are all symmetrical bodies of revolution made from a synthetic plastics material.

12. A writing instrument substantially as herein described with reference to the accompanying drawings.

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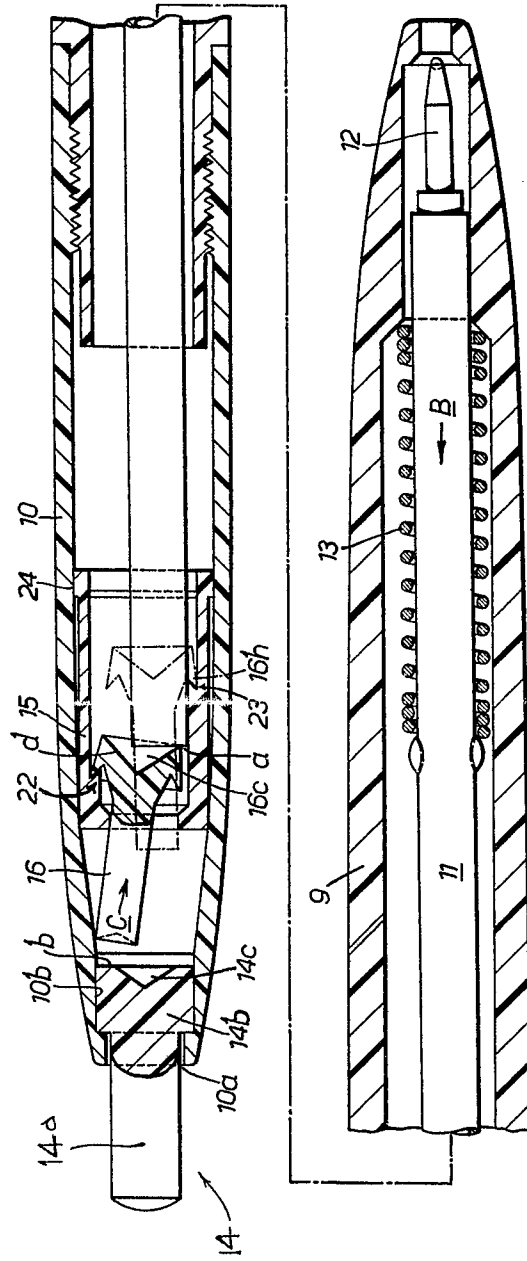
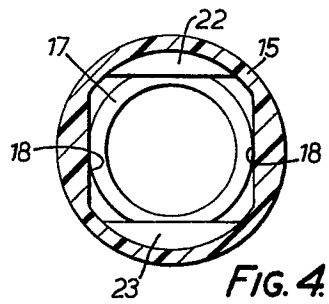
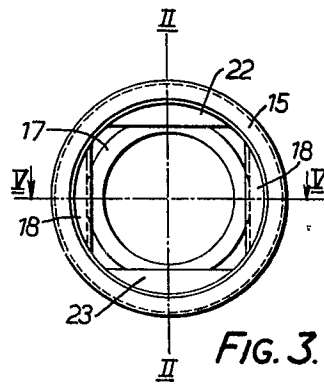
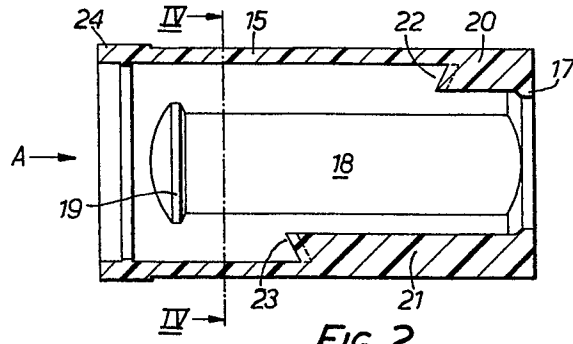


FIG. 1.



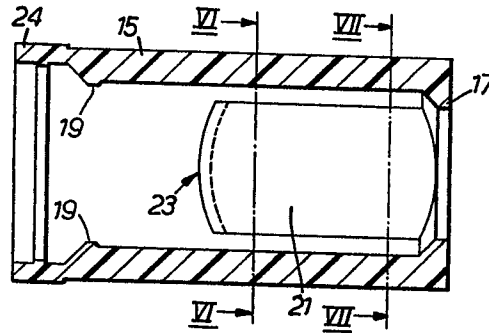


FIG. 5.

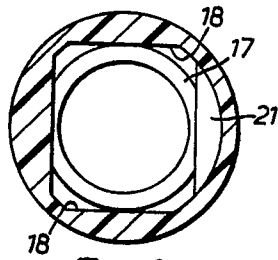


FIG. 6.

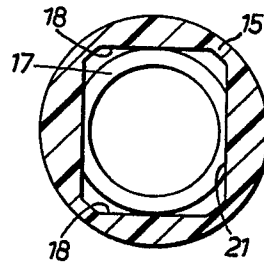


FIG. 7.

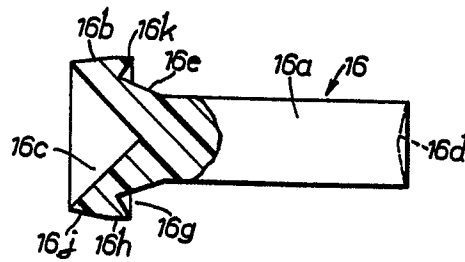


FIG. 8.