

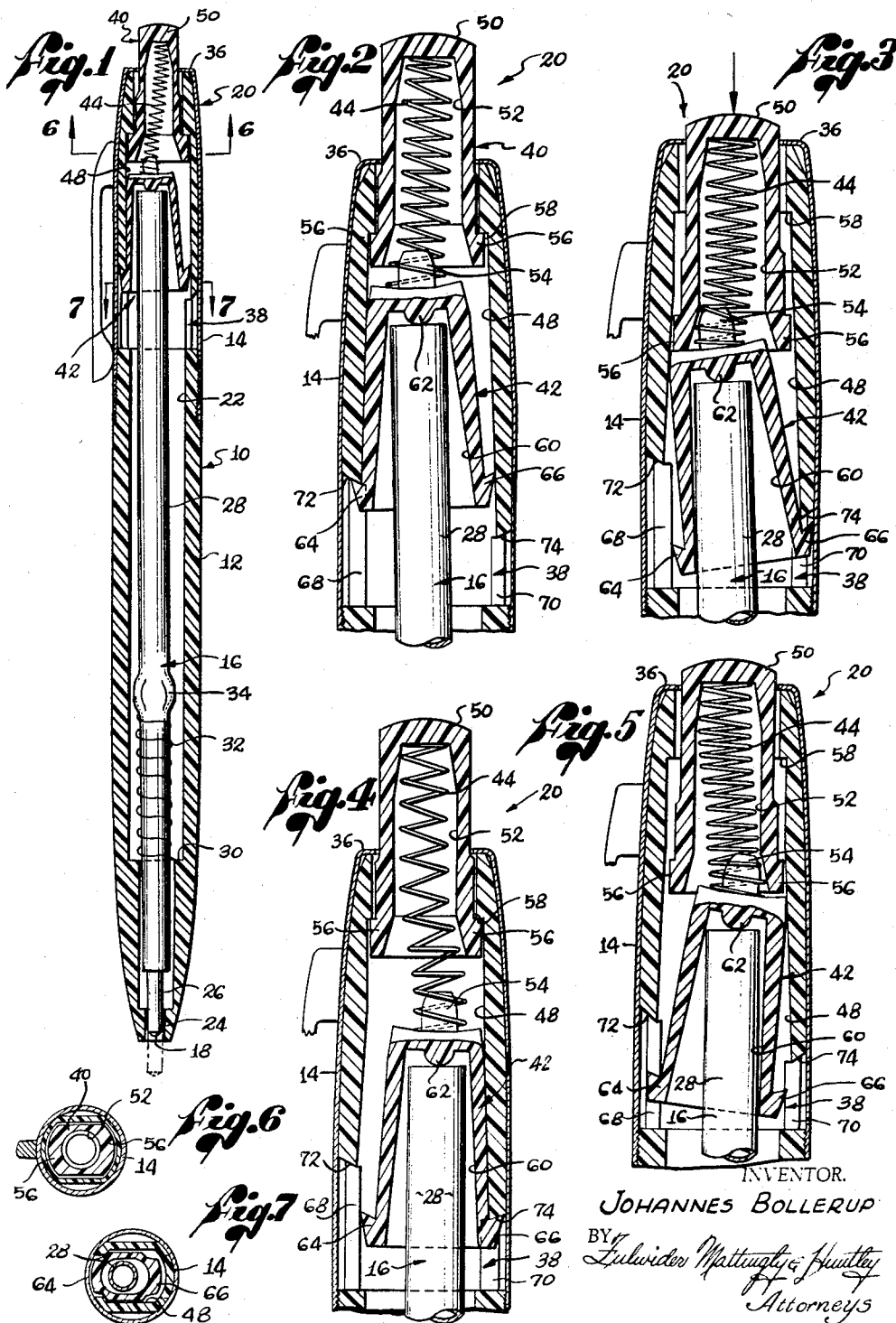
March 29, 1960

J. BOLLERUP

2,930,355

BALL POINT PEN

Filed July 30, 1957



1

2,930,355

BALL POINT PEN

Johannes Bollerup, Monterey Park, Calif., assignor, by mesne assignments, to Scripto, Inc., Atlanta, Ga., a corporation of Georgia

Application July 30, 1957, Serial No. 675,149

12 Claims. (Cl. 120—42.03)

The present invention relates to ball point pens and more particularly to pens of this type in which the point can be retracted and extended at will by a single control.

An object of my invention is to provide an improved pen of the ball point type in which the writing point can be extended out of the barrel into writing position and retracted into protected non-writing position in the barrel by consecutive depressions of a rear-end mounted pushbutton.

A further object of the invention is to provide a writing instrument in which a readily replaceable ball point and cartridge unit is resiliently suspended within a barrel for extension and retraction by pushbutton actuated latching mechanism.

Another object of the present invention is to provide a writing instrument of the type indicated above wherein the several parts thereof can easily be fabricated economically by virtue of the elimination of excessively close tolerances.

Still another object of the invention is to provide a ball point writing instrument of the pushbutton retractable point type having a vastly simplified and improved latching mechanism of exceptionally durable construction that will operate without failure during the service life of the device.

These and other objects and advantages of my invention will be apparent from the following description of a presently preferred embodiment thereof when taken in conjunction with the attached drawings wherein:

Figure 1 is a longitudinal sectional view of a ball point pen embodying the invention, the ball point being shown in full line in retracted position and in phantom line in extended writing position;

Figure 2 is a partial longitudinal sectional view, on an enlarged scale, of the latching means and push button located at the rear end of the pen, the several components being shown in the retracted position of the ball point;

Figures 3 through 5 are views similar to Figure 1 but showing the several components in pen point extending, extended or writing position, and pen point retracting relationships, respectively;

Figure 6 is a sectional view taken along the line 6—6 of Figure 1; and

Figure 7 is a sectional view taken on the line 7—7 of Figure 1.

Referring to Figure 1, my improved ball point pen includes an elongate tubular holder 10 comprising an assembly of a barrel 12 having a tubular cap 14 threadedly connected to its rear end. The holder 10 encloses a ball and cartridge unit 16 that is generally of a conventional construction and accordingly will not be described in detail. Suffice it to say that the unit 16 is a self-contained element removable as a whole from the holder 10. In order to move the ball point 18 of the unit 16 inwardly and outwardly of the front tip of holder 10, a latching mechanism indicated generally by the numeral 20 is enclosed in the cap 14 in operative association with the ball and cartridge unit 16.

2

The action of the latching mechanism 20 is such that the unit 16 is shifted laterally during extension and retraction thereof. Therefore, the unit 16 is not axially slidably mounted in the holder whose central bore 22 is of larger diameter than the outside diameter of the unit 16 in order to permit such lateral displacement. A similar arrangement is utilized in the tapered front end of the barrel 12 wherein the tip opening 24 is of larger diameter than the tubular stem 26 which connects the ball point 18 with the reservoir 28 of the unit 16.

In order to bias the unit 16 towards the retracted position of Figure 1 wherein the ball point 18 is recessed within the tip opening 24, the barrel's central bore 22 is provided with a rearwardly facing shoulder 30 to receive one end of a spring 32 which is coiled around the reservoir 28. The other end of spring 32 bears against a shoulder 34 which is formed in the reservoir 28 by pinching or crimping the tubular material thereof. This resilient mounting of the lower end of the unit 16 biases it into engagement with the latching mechanism 20 contained in the tubular cap 14 and when the cap is removed from barrel 12 the ball and cartridge unit 16 and spring 32 are readily removable from the holder 10.

In order to retain the latching mechanism 20 against the biasing action of the spring 32, the cap 14 at its upper end is formed with an inwardly turned flange 36 which abuts the rear end of a sleeve 38. As is best seen in Figures 2 through 5, in addition to the sleeve 38 the latching mechanism 20 also includes a plunger 40 axially slidably mounted through the upper end of sleeve 38, a bell-shaped latch member 42 and a compression spring 44 resiliently separating plunger 40 and latch 42.

In order to prevent relative rotation of the several components of latching mechanism 20 in order to maintain them in operative alignment, each of the components is formed with a pair of flats on opposite sides thereof, as is shown in Figures 6 and 7.

The plunger 40 has an integrally formed pushbutton portion 50 which protrudes through the rear end of the cap 14. A downwardly opening spring pocket 52 is defined in the plunger 40 to receive the coil spring 44, the lower end of the spring 44 bearing against the upper end of latch 42 and being retained on the center thereof by a centering member 54 formed integrally with latch 42. It will be understood that the spring 44 is of lesser force than the spring 32 enclosed in the lower end of barrel 12 and serves to bias the pushbutton 50 outwardly of cap 14 independently of the action of the spring 32. The lower end of the plunger 40 is formed with oppositely-disposed, outwardly-extending abutments 56 which are engageable with complementary internal shoulders 58 of the sleeve 38 to retain the plunger 40 in the sleeve 38.

In order to couple the ball and cartridge unit 16 to the latch 42, the latter is provided with a central downwardly opening frusto-conical cavity 60, the closed end of which is provided with a semi-spherical or semi-cylindrical protrusion 62 against which the upper or rear end face of the unit 16 pivotally bears. The enlarged diameter lower end of the latch 42 is formed with oppositely disposed, radially outwardly extending arm 64 and arm 66, one of which is vertically slidably received in a downwardly opening slot 68 formed in one side of the sleeve 38 and the other of which is vertically slidably received in a downwardly opening slot 70 on the opposite side of sleeve 38. It will be observed that the slots 68 and 70 at their upper or rear ends terminate in latch shoulders 72 and 74, respectively, which are adapted to matingly engage the acute angle shoulders defined between the arms 64 and 66 and the side walls of latch 42. Comparing Figure 2 with Figure 3, it will be observed

that when the latch arm 64 engages the latch shoulder 72 that the ball point 18 is in retracted position. As is shown in Figure 4 when the latch arm 66 engages the latch shoulder 74 the ball point 18 is retained in extended position against the biasing action of the spring 32.

Assuming the ball point to be in retracted position as in Figures 1 and 2, when the push button 50 is depressed the lower end thereof engages one side only of the upper end of the latch 42, inasmuch as the upper end of the bell-shaped latch 42 is of lesser diameter than the lower end of the plunger 40. It will be observed that this point of contact is laterally off-set from the point of contact of the protrusion 62 of latch 42 with the upper end of the unit 16 thereby achieving a rotating couple tending to rotate latch 42 in a counter-clockwise direction as viewed in Figure 3. Thus, when the latch 42 has been depressed to a point where the latch arm 66 is lower than the latch shoulder 74 the latch 42 rotates into the position shown in Figure 3. Release of plunger 40 then causes latching engagement of arm 66 with shoulder 74, latch 42 now rotating clockwise into the attitude of Figure 4 due to the rotative couple 74-62. The attitude of latch 42 shown in Figure 4 is now opposite to the inclination of the latch 42 as represented in Figure 2. The ball point 18 is then extended into the writing position indicated in phantom outline in Figure 1.

Retraction of the ball point 18 is accomplished in a similar manner. Referring to Figure 5 it will be seen that when push button 50 is depressed that it engages the upper end of the latch 42 on the opposite side of the centering member 54. Inasmuch as this point of contact is laterally off-set from the pivotal connection of member 16 with the protrusion 62 a rotative couple tending to rotate the latch 42 in a clockwise direction is achieved whereby the latch 42 pivots to swing the latch arm 66 out of engagement with the latch shoulder 74. Thereafter, upon release of manual pressure on the push-button 50 the other latch arm 64, having been swung into the slot 68, is moved into engagement with the latch shoulder 72 when spring 32 retracts unit 16 and latch 42. Thereafter, continued retracting movement of unit 16 causes latch 42 to move in counter-clockwise direction due to the rotative couple 72-62 until stopped by the wall of sleeve 38 in the attitude of Figure 2.

Various modifications and changes may be made with respect to the foregoing description without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. An improved writing implement comprising a barrel having a forward opening, an elongated writing element located in said barrel and longitudinally slidable therein between an advanced and retracted position, spring means normally urging said writing element toward said retracted position, a laterally movable and rockable locking member provided with a rearwardly directed face having a transverse abutment surface and being longitudinally movable between an advanced and retracted position and having an axial portion in rockable engagement with the upper end of the writing element and movable with said writing element to be normally urged by said spring means to the retracted position, a first latching element located on one side of said locking member spaced longitudinally from said abutment surface, a second relatively stationary latching element fixed to said barrel and releasably engaging said first latching element and pivoting the locking member thereabout to a position off-set and substantially parallel to the longitudinal axis of said barrel and so positioned that said writing element is in advanced position upon engagement between said latching elements, and a plunger longitudinally movable between an advanced and retracted position and having a pair of laterally spaced abutment elements directed towards said rearwardly di-

rected face of said locking member, said abutment elements alternately engaging portions of the rearwardly directed face laterally spaced from the midpoint of said locking member axial portion, respectively applying a moment of force laterally of said midpoint when said locking member is moved to its advanced position to move said first latching element toward said second latching element for said releasable engagement and to remove said first latching element therefrom for movement to retracted position.

2. An improved writing implement comprising a barrel having a forward opening, an elongated writing element located in said barrel and longitudinally slidable therein between advanced and retracted positions, spring means normally urging said writing element toward said retracted position, a laterally rockable locking member having a forwardly directed axial portion in rockable engagement with the upper end of said writing element and being longitudinally movable with said writing element between said advanced and retracted positions and normally urged with said writing element to said retracted position by said spring means, a first latching element located on one side of said locking member, a second relatively stationary latching element fixed to said barrel and releasably engaging said first latching element and pivoting the locking member thereabout to a position off-set and substantially parallel to the longitudinal axis of said barrel and so positioned that said writing element is in advanced position upon engagement between said latching elements, a rearwardly directed abutment surface on said locking member spaced longitudinally from said first latching element, and a plunger longitudinally movable between advanced and retracted positions and having an abutment element directed forwardly towards said rearwardly directed abutment surface of said locking member, said plunger abutment element engaging the rearwardly directed abutment surface of said locking member in laterally spaced relation with respect to the midpoint of said locking member axial portion and respectively applying a force laterally of said midpoint when said locking member is moved to its advanced position to move said first latching element toward said second latching element for said releasable engagement, and said locking member upon engagement of said first latching element at said second latching element being reset by said pivoting for subsequent release from said engagement.

3. An improved writing implement comprising a barrel, a depressible plunger disposed for longitudinal sliding within said barrel and projecting beyond the rear barrel end, an elongated writing element biased rearwardly within said barrel and slidably disposed therein to shift longitudinally between projected and retracted positions with respect to the forward barrel end, and a laterally rockable and longitudinally movable latch member disposed within said barrel in fulcrumed relation with respect to the rear end of said writing unit and forwardly of said plunger, said latch member being unattached to the barrel or writing elements and having rearwardly facing contact areas at opposite sides thereof and opposite laterally extending latching elements at said opposite sides spaced longitudinally from said contact areas, said barrel having opposite latching shoulders fixed therein for releasably engaging the respective latching elements on said latch member for latching said writing element alternately at said projected and retracted positions, said plunger having forwardly facing contact areas disposed in opposing operative relation to said latch member contact areas and being engageable with said latch member upon successive plunger depressions for laterally rocking said latch member alternately in opposite directions for alternately engaging said latch member latching elements and respective barrel latching shoulders, and said latch member upon each release of the depressed plunger after latching at one of said bar-

5

rel latching shoulders being pivoted about said barrel shoulder and thereby reset under the force of said writing element biasing means for opposite operating contact with said plunger upon the next succeeding depression thereof.

4. In a writing implement comprising a barrel, a writing unit and a depressible plunger disposed within the barrel to move longitudinally therein for alternate projection and retraction of the writing unit upon successive depressions of the plunger, forwardly facing abutment means fixed in said barrel for engaging a latch, and means biasing said writing unit rearwardly in said barrel toward retracted position, the improvement which comprises a laterally rockable and longitudinally movable latch member disposed within said barrel in fulcrumed relation with respect to the rear end of said rearwardly biased writing unit and forwardly of said plunger, said latch member having rearwardly facing contact areas and latching portions longitudinally spaced therefrom, said latching portions being alternately engaged with said barrel abutment means, a first depression of said plunger applying a force to said fulcrumed latch member directed to rock said latch member and to laterally shift the unengaged latching portion thereof toward engagement with said unengaged barrel abutment means, and said latch member upon said last mentioned engagement being pivoted oppositely about said abutment means under the force of said writing unit biasing means and being thereby reset in relation to said plunger so that the force applied thereto by said plunger upon a second depression thereof rocks and laterally shifts said latch in a direction opposite to that occurring upon said first mentioned plunger depression.

5. In a writing instrument comprising a barrel, a writing unit and a plunger slidably disposed within the barrel for alternate longitudinal projection and retraction of the writing unit upon successive depressions of the plunger, and means biasing said writing unit toward retracted position, the improvement which comprises a latch member having contact areas and latching portions spaced longitudinally therefrom, slidably disposed in fulcrumed relation at the rear end of said writing unit and within said barrel forwardly of the plunger, said latch member being unattached to the barrel or writing unit and being actuated by said plunger to rock transversely in said fulcrumed relation incident to longitudinal movement of said plunger and latch member to shift said writing unit between projected and retracted positions, said plunger being engageable with said latch member contact areas upon successive plunger depressions for rocking said latch member alternately in opposite directions, said barrel being arranged interiorly to allow rocking of said latch member and having means therein engageable by said latch member latching portions upon rocking thereof to position said writing unit alternately in said projected and retracted positions, and said latch member upon each engagement of one of the latching portions thereof with said barrel means being pivoted about said barrel means under the force of said writing element biasing means and thereby reset for opposite actuating engagement by said plunger upon the next succeeding depression thereof.

6. An improved writing implement comprising a barrel, a depressible plunger disposed for longitudinal sliding within said barrel and projecting beyond the rear barrel end, a writing element biased rearwardly within said barrel and slidably disposed therein to shift longitudinally between projected and retracted positions with respect to the forward barrel end, and a laterally rockable and longitudinally movable latch member disposed within said barrel rearwardly of said writing unit and forwardly of said plunger, said latch member being unat-

6

tached to the writing element and having rearwardly facing contact areas and longitudinally spaced laterally extending latching portions, said barrel having latching shoulder portions disposed therein for releasably engaging a latching portion of said latch member for latching said writing element alternately at said projected and retracted positions, said plunger having forwardly facing contact areas disposed in opposing operative relation to said latch member contact areas and being engageable with said latch member upon successive plunger depressions for laterally rocking said latch member alternately in opposite directions for engaging said latch member with alternate barrel latching shoulder portions, and said latch member upon each release of the depressed plunger after latching at one of said barrel latching shoulder portions being pivoted about said latching shoulder portion and thereby reset under the force of said writing element biasing means for opposite operating contact with said plunger upon the next succeeding depression thereof.

7. An improved writing implement as defined in claim 6 and further characterized in that upon succeeding plunger depressions said forwardly facing plunger contact areas alternately engage the respectively opposed rearwardly facing contact areas of said latch member in adjacent relation with respect to the engage latching portion of said latch member.

8. An improved writing implement as defined in claim 6 and further characterized in that said latch member is formed with a central downwardly opening cavity, the closed end of which cavity has a protrusion formed thereat against which the rear end of said writing element pivotally bears.

9. An improved writing implement as defined in claim 6 and further characterized in that said latch member is formed with a central downwardly opening cavity, the closed end of said cavity having a protrusion formed thereat against which the rear end of said writing element pivotally bears, the lower end of said latch member having said latching portions formed thereat longitudinally adjacent the open end of said cavity, and said rearwardly facing contact areas being provided at the upper end of said latch member exteriorly with respect to the closed end of said cavity.

10. An improved writing implement as defined in claim 9 and further characterized in that latch member cavity is frusto-conical.

11. An improved writing implement as defined in claim 6 and further characterized in that said depressible plunger is also biased rearwardly for returning to a normal undepressed position with respect to said barrel independently of said rearwardly biased writing element.

12. An improved writing implement as defined in claim 6 and further characterized in that said barrel latching shoulder portions are laterally spaced in an extent exceeding the width of said latch member rearwardly of the laterally extending latching portions thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

2,584,569	Frentzel	Feb. 5, 1952
2,863,421	Rizzo	Dec. 9, 1958
2,865,331	Marcotte	Dec. 23, 1958

FOREIGN PATENTS

2,017	Great Britain	of 1890
53,926	Germany	Oct. 10, 1890
840,819	France	Jan. 13, 1939
167,320	Australia	Mar. 26, 1954
748,897	Great Britain	May 16, 1956
1,127,686	France	Aug. 13, 1956