

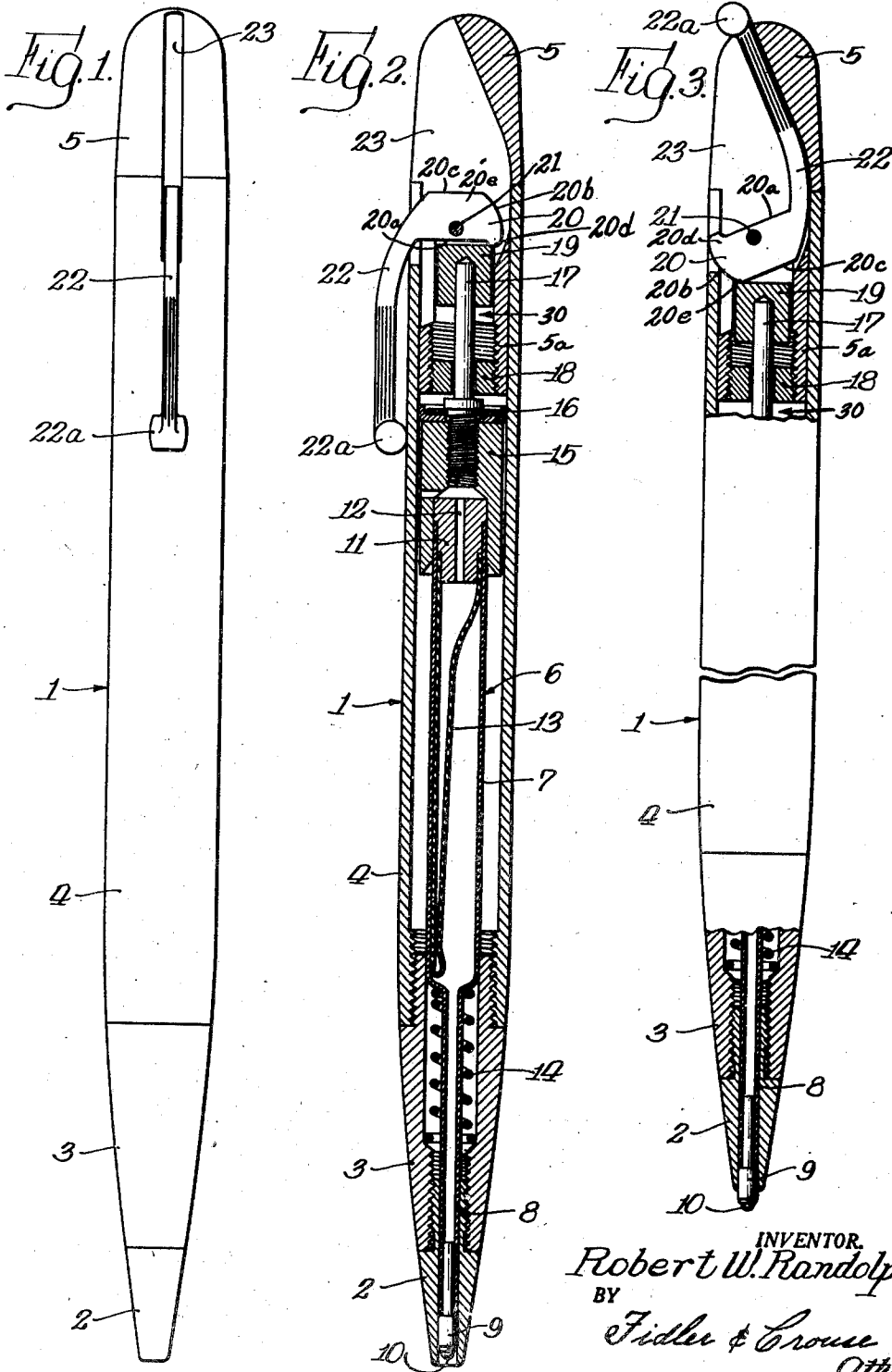
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BALL-POINT WRITING INSTRUMENT

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BALL-POINT WRITING INSTRUMENT

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This invention relates to writing instruments of the kind wherein the writing point is retractable into the holder and, alternately, propellable forwardly into writing position; and it has to do more particularly with ball-point writing instruments of the type which comprises a self-contained, replaceable ball-and-cartridge mounted in an elongate housing in which it is reciprocable lengthwise to propel and retract the writing point.

The primary object is to provide an instrument of the above-indicated character which is rugged and reliable and at the same time simple to operate and economical to manufacture.

To that end the invention contemplates a construction wherein the writing point is propelled and retracted by means of a finger-operated lever arm which extends to the exterior of the holder and which, preferably but not necessarily, serves as a pocket clip when the writing point is retracted.

According to the preferred practice the invention is characterized by the provision of a cam which is rotatable by the aforementioned lever arm to propel the writing point forwardly and which inherently serves as a lock to positively hold the writing point in its forwardmost position until intentionally released.

An important feature of the invention, when so carried out that the lever arm serves also as a pocket clip, is that said lever arm can be made as strong and rigid as desired because it does not depend upon its own resiliency to render it effective as a pocket clip—the necessary spring pressure being provided by the spring which functions to retract the writing point.

Another feature, according to the preferred practice of the invention, resides in a mechanical construction which enables the operating lever arm to recede into the holder, where it is out of the way, when the instrument is adjusted for use; that is to say, when the writing point is in its forward position.

Still another feature of the invention, which is highly desirable but not indispensable, resides in the provision of a simple dashpot arrangement which serves to prevent excessively abrupt retraction and thus avoids the audible click which otherwise often would occur when the lever arm is returned to the retracted position.

In the drawing which accompanies this specification:

Fig. 1 is an elevational view of a ball-point writing instrument constructed in accordance with the present invention;

Fig. 2 is a longitudinal sectional view showing

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the ball point and propel-repel mechanism in the retracted or repelled position; and

Fig. 3 is a longitudinal sectional view similar to Fig. 2 but showing the ball point and propel-repel mechanism in the propelled or projected position.

The instrument shown comprises a hollow, elongate holder 1 which includes a tapered metal tip member 2, a secondary or intermediate tip member 3, which may be made of plastic material, a tubular barrel 4 which may likewise be of plastic material and a cap member 5 of plastic material. Tip member 2 is threaded into secondary tip member 3, which in turn is threaded into the front end of barrel 4. The cap member 5 has a tubular portion 5a which is telescoped into and cemented in the back end of the bore of barrel 4.

Encased within the holder is a self-contained replaceable ball-and-cartridge unit 6 comprising a tubular ink-reservoir portion 7 having an integral ink-feed tube 8, into the front end of which is inserted a tubular member 9 which is suitably formed at its front end to receive and seat a ball point 10. The back end of reservoir 7 is closed by a plug 11 having a vent hole 12. Plug 11 serves as an anchor for a collapsible rubber sac 13 which serves to maintain at least atmospheric pressure on the ink in the reservoir 7 and where the ink is fed from the reservoir toward the ball point 10. The sac 13 also functions as a seal to prevent ink within reservoir 7 from leaking out through vent hole 12.

The ball-and-cartridge unit 6 is reciprocable lengthwise within the holder and is continuously urged backwardly toward its retracted position by a coil spring 14. In Fig. 2 the ball-and-cartridge unit is shown in its retracted position—the ball-point pen being retracted into the bore of tip member 2.

The back end of unit 6 is seated in a recess in member 15 which together with a flexible cup 16 forms the piston of a dashpot the purpose of which is to prevent too rapid retraction of unit 6. Threaded into member 15 is an axially extending piston rod 17 which is slidable in a guide bushing 18 threaded into the extension 5a and is provided with a head 19. The head 19 is slidably movable lengthwise of the holder 1 under the influence of a cam 20 rotatably mounted on a pivot 21 and having an integral lever arm 22 extending to the exterior of the holder and so formed that when element 6 is in its retracted position, as shown in Fig. 2, the lever arm lies generally parallel, lengthwise, to the holder and

points in the general direction of the front end of the holder.

Cam 20 is disposed in a narrow longitudinally extending slot 23 which is so formed that it will receive all except the tip end 22a of lever arm 22 when said lever arm is moved to the position depicted in Fig. 3 wherein the ball-and-cartridge unit 6 is in its forwardmost position.

It will be seen from the drawings that the cam 20 is formed with an edge portion 20a, located relatively close to the pivot 21, an arcuate edge portion 20b struck on a radius about the pivot 21 at a distance somewhat greater than the distance of the edge portion 20a from the pivot 21, and an edge portion 20c, considerably further from the pivot 21 than the edge portion 20a but somewhat closer than the edge portion 20b. A toe 20d is formed at the junction of the edge portions 20a and 20b and a heel 20e is formed at the junction of the edge portions 20b and 20c.

Lever arm 22 is manually rotatable from the position in which it is shown in Fig. 2 to the other extreme position depicted in Fig. 3 and upon being so moved it rotates cam 20 about pivot 21 and causes the toe 20d to be rotated forwardly and across the upper surface of the head 19 to depress the latter and thus cause a forward movement of the entire plunger assembly 30 comprising members 15, 16, 17 and 19 which, in turn, produces a like forward movement of ball-and-cartridge unit 6. When the toe 20d is in a position to the right (as viewed in Fig. 2) of a plane through the pivot 21 and axially of the holder (or what may be termed "dead center") the plunger assembly 30, under the influence of the spring 14, applies a force on the cam 20, tending to rotate it in a counterclockwise direction (as viewed in Fig. 2). However, when the toe 20d is moved to a position to the left of dead center and the head 19 bears against the arcuate edge portion 20b, the plunger assembly 30 exerts a force on the cam 20 in such plane and thus does not tend to rotate the cam. When, however, the cam 20 is rotated to a position to the left of dead center, the plunger assembly 30 exerts a force on the cam 20 tending to rotate it in a clockwise direction.

Thus it will be seen that by reason of the location of pivot 21, and the shape of the cam 20, the cam 20 is self-locking in the position in which it is shown in Fig. 3 and, accordingly, is effective to hold the writing point in its propelled position until lever arm 22 is intentionally moved back to the position in which it is shown in Fig. 2.

Cam 20 is so formed that when it is in the position of Fig. 2 it serves as a lever to transmit the force of spring 14 to the tip end 22a of lever arm 22, thus producing a considerable gripping pressure between said tip end and the outside surface of the holder, which pressure is such as to enable lever arm 22 to function as a pocket clip when in the position of Fig. 2. Since this pressure does not depend upon the resiliency of lever arm 22, as in the usual pocket clip, said lever arm can be of more rugged construction than the usual pocket clip.

As will be self-evident, cam 20 and lever arm 22 constitute, jointly, a form of lever mechanism which may correctly be denominated, more specifically, as a cam-and-lever mechanism. Moreover, it will be observed that the behavior of cam 20 is that of a simple lever during a part of its rotation.

In rotating lever arm 22 from the position of Fig. 3 to that of Fig. 2 there is an inherent tend-

ency for snap action to occur as soon as the toe of cam 20 passes dead center. This is somewhat objectionable because of the clicking noise which is produced when the end of the lever arm strikes the holder and also because of the resultant tendency to mar the holder. The aforementioned snap action is largely or wholly avoided as a result of the damping or cushioning effect of the dashpot.

By telescoping cap 5 into barrel 4 and mounting cam 20 in said cap member the hole for pivot pin 21 is concealed without resort to plugging—which is a factor to be considered in any product where appearance is such an important factor.

To remove and replace the ball-and-cartridge unit it is necessary only to unscrew the intermediate tip member 3 from the front end of barrel 4 whereupon the unit can easily be withdrawn. At the same time the piston and piston rod comprising elements 15, 16 and 17 can be withdrawn from the barrel since rod 17 is made to slidably fit the bore of member 19.

I claim:

1. A writing instrument comprising a holder having an open forward end, a unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the open forward end of said holder, and actuating means for projecting and retracting said unit including a lever mounted for manual pivotal movement relative to said holder and means operatively interposed between said lever and said unit and actuated by movement of said lever about its pivot to project and retract said unit respectively.
2. In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, spring means continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, and means including a manually operable lever active upon movement of said lever upon its pivot for propelling said unit forwardly whereby to propel said writing point from its retracted position to a position exterior of the holder and releasably hold it in projected position.
3. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the adjacent forward end of said holder, a pocket clip element, means pivotally mounting said clip element on said holder for manual movement between active clipping position and inactive position, and actuating means operatively interposed between said clip element and said unit for projecting said unit upon movement of said clip element into inactive position and retracting said unit upon movement of said clip element into active clipping position.
4. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point adapted to be projected and retracted through the adjacent open end of said holder, a recess in said holder, a pocket clip element, means pivotally mounting said clip element for manual movement between an active clipping position projecting from said holder and inactive position retracted within said recess, and actuating means operatively interposed between said clip element

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and said unit for projecting said unit upon movement of said clip element into inactive position and for retracting said unit upon movement of said clip element into active clipping position.

5 In a writing instrument, an elongated, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, a cam within said holder for propelling said unit whereby to propel said writing point from a retracted position within the holder to an alternate position exterior thereof, manually operable means for actuating said cam including a pocket clip element, mounted for manual movement between active clipping and inactive positions, and means for retracting said unit whereby to move said writing point into said holder when said clip element is manually moved toward active position.

6 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, a cam within said holder for propelling said unit whereby to propel said writing point from a retracted position within the holder to an alternate position exterior thereof, a manually operable lever connected with said cam for operating the same, said lever extending to the outside of said holder, and means for retracting said unit whereby to move said writing point into said holder.

7 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, spring means continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, a rotatable cam mounted in said holder and operative upon rotation to propel said unit forwardly whereby to move said writing point from its retracted position to a writing position exterior of said holder, said cam being rotatable past a dead center position whereby it is operative to lock said unit in its forwardmost position, and a manually operable lever connected to said cam for rotating the same and projecting out of said holder to render it accessible for manual operation.

8 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, and actuating means for reciprocating said unit whereby to retract said writing point through the front end of said bore to a position within said holder and, alternately, to propel said writing point through the front end of said bore to a writing position exterior of said holder, said actuating means including a manually operable lever arm fulcrumed within said holder and projecting outwardly of the holder from its fulcrum, said lever arm being so formed and mounted that, when said writing point is retracted, said lever arm lies generally parallel to said holder with its free end extending forwardly and means actuated by said lever arm operative to propel said unit forwardly when said lever arm is rotated out of the above-defined position.

9 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said

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element having a writing point at its forward end, and actuating means for reciprocating said unit whereby to retract said writing point through the front end of said bore to a position within said holder and, alternately, to propel said writing point through the front end of said bore to a writing position exterior of said holder, said actuating means including a manually operable pocket clip element fulcrumed within said holder and projecting outwardly of the holder from its fulcrum, said clip element being so formed that, when said writing point is retracted, it lies generally parallel to said holder inactive clipping position, and means actuated by said clip element operative to propel said element forwardly when said clip element is rotated out of the above-defined position toward inactive position.

10 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, spring means continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, a rotatable cam pivotally mounted in said holder at the rear of said unit and operative upon rotation in one direction to propel said unit forwardly whereby to move said writing point from its retracted position to a writing position exterior of said holder and to lock said unit in its forwardmost position, and a lever arm connected to said cam and projecting therefrom to exterior of said holder for manually actuating said cam, said lever arm being so formed that, when said element is retracted, said lever arm lies closely adjacent to and generally parallel to said holder with its free end extending forwardly, lengthwise, and points toward the front end of the holder, said lever arm being rotatable, together with said cam, out of the above-defined position to propel said element forwardly, said spring means in association with said unit and said cam being operative to yieldingly maintain said lever arm in said forwardly extending position whereby said lever arm, when in said position, functions in conjunction with said holder as a pocket clip.

11 In a writing instrument, an elongate hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, a spring continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, a slot formed in and extending lengthwise of said holder and situated at the rear of said unit, a cam disposed in said slot in driving engagement with the back end of said unit and rotatable about an axis extending normally to the longitudinal axis of said holder, a lever arm connected to said cam and extending outwardly of said slot, said lever arm being operative to rotate said cam about said axis and so formed that, when said unit is in its retracted position, said lever arm lies closely adjacent to and generally parallel to said holder, said cam being operative in response to rotation of said lever arm out of its above-defined position to propel said element forwardly, said slot being proportioned to receive said lever arm and thus permit recession of the greater part thereof into said holder when said lever arm is rotated.

12 In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and

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reciprocable lengthwise of said holder, said unit having a writing point at its forward end, spring means continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, a manually operable cam-and-lever mechanism for propelling said unit forwardly, and dashpot means for damping the retraction of said unit.

13. In a writing instrument, an elongate, hollow holder having a lengthwise bore opening at its front end, a writing unit mounted within and reciprocable lengthwise of said holder, said unit having a writing point at its forward end, a spring continuously urging said unit backwardly in said holder whereby to retract said writing point into said bore, a rotatable cam pivotally mounted in said holder to the rear of said unit and operative upon rotation to propel said unit forwardly whereby to move said writing point from its retracted position to a second position exterior of said holder, a lever arm connected with said cam and extending therefrom to the exterior of said holder, said lever arm being operative to rotate said cam and being so formed that, when said unit is in its retracted position, said lever arm lies closely adjacent and generally parallel to said holder, and means within said holder operative to yieldingly cushion the retraction of said unit.

14. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the adjacent forward end of said holder, resilient retracting means constantly urging said unit toward retracted position, and actuating means for projecting said unit including a pocket clip element, means mounting said clip element for manual rotation between active clipping position and inactive position, and means actuated by movement of said clip element toward inactive position for projecting said unit, said retracting means and said actuating means being active to hold said clip element releasably in active or inactive positions respectively.

15. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the adjacent forward end of said holder, resilient retracting means constantly urging said unit toward retracted position, and actuating means for projecting said unit including an actuating lever pivotally mounted relatively to said holder, and driving means operatively interposed between said lever and said unit and having a dead center position whereby

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upon rotation of said lever in one direction, said unit is projected and upon rotation of said lever in the opposite direction, said unit is released for movement by said retracting means into retracted position, and said retracting means and said driving means are active to hold said unit releasably in projected or retracted position, respectively.

16. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the adjacent forward end of said holder and means for projecting and retracting said unit including spring means for moving said unit in one direction, a pivotally mounted cam for moving said unit in the opposite direction against the action of said spring means, and manually operable means for rocking said cam in one direction to move said unit against the action of said spring means and in the opposite direction to permit said spring means to move said unit in said first direction.

17. A writing instrument comprising a holder having an open forward end, a writing unit slidably mounted in said holder and having a writing point at its forward end adapted to be projected and retracted through the adjacent forward end of the holder, a pocket clip element, means pivotally mounting said clip element on said holder for manual movement between active clipping position, and means operatively interposed between said clip element and said unit for projecting said unit when said clip is moved into inactive position and for retracting said unit when said clip element is moved into active position and including a spring resiliently urging said unit toward retracted position and operative when said clip element is in active position to resiliently maintain said clip element in such position.

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Certificate of Correction

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ROBERT W. RANDOLPH

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 6, line 72, claim 11, after the word "rotated" and before the period insert *to propel said unit*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2d day of December, A. D. 1947.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents,