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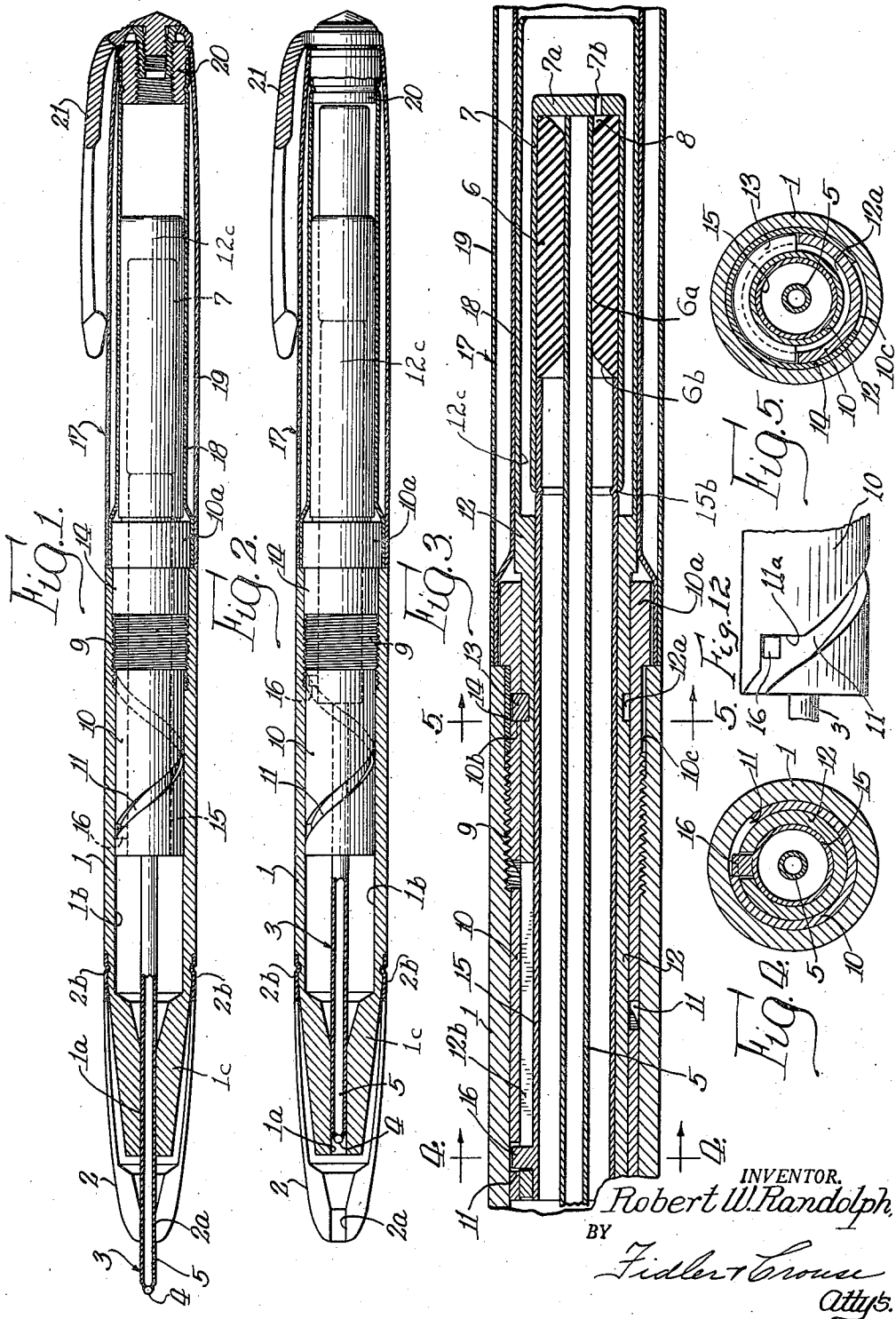
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2,454,086

BALL-POINT WRITING INSTRUMENT

Filed Aug. 16, 1946

2 Sheets-Sheet 1



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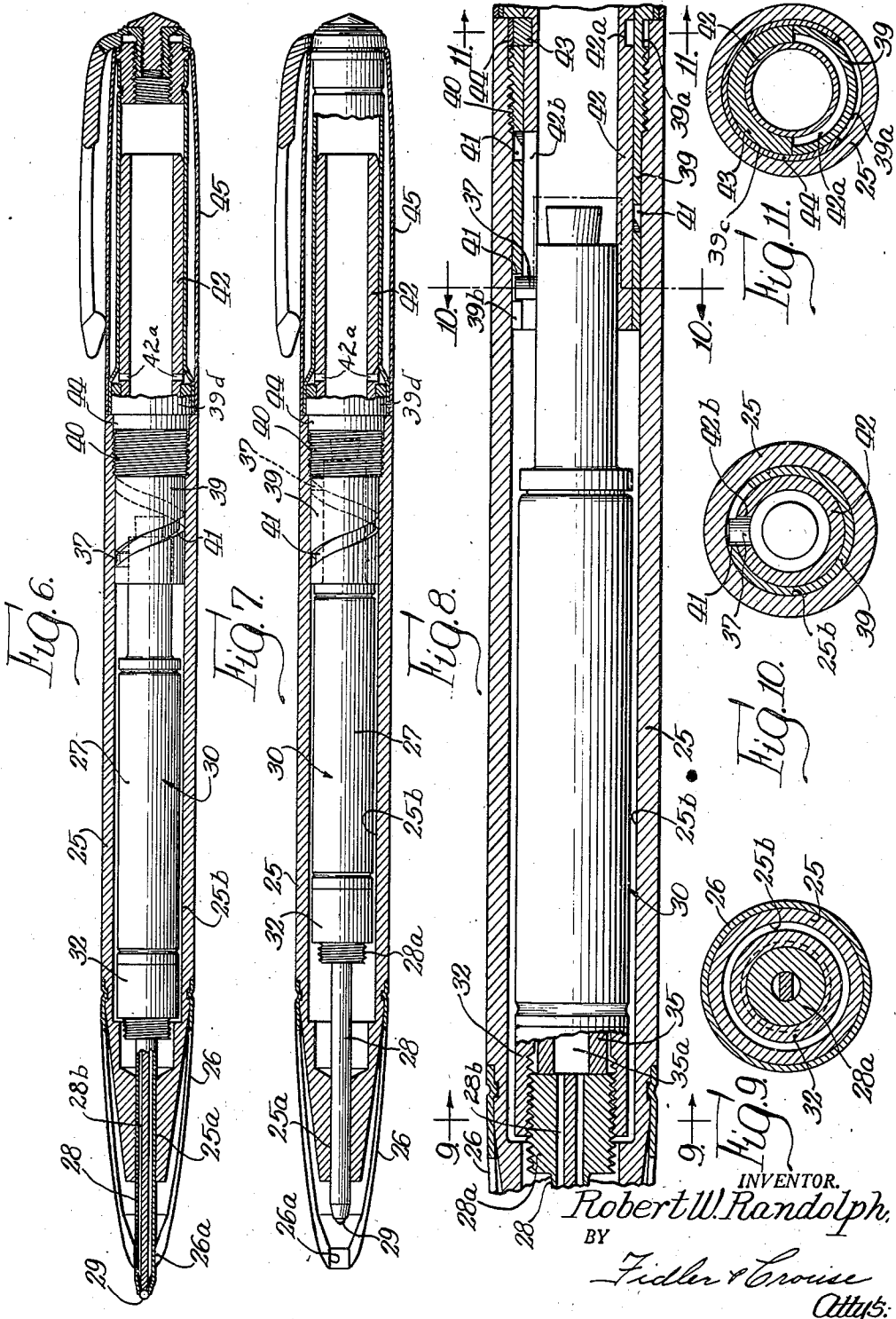
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# UNITED STATES PATENT OFFICE

2,454,086

## BALL-POINT WRITING INSTRUMENT

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Application August 16, 1946, Serial No. 690,971

18 Claims. (Cl. 120—42.03)

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This invention relates to ball-point writing instruments and has to do particularly with such instruments having an improved projection and retraction mechanism for moving the writing point between a non-writing position concealed in the casing and an exposed writing position projecting from the casing.

An object of the present invention is to provide a ball-point writing instrument having an improved mechanism for effecting relative movement of the writing point and a housing therefor between a position wherein the point is exposed for writing and a position wherein the point is concealed within the housing.

Another object of the invention is to provide a ball-point writing instrument having a readily removable and replaceable point-and-cartridge unit, and an improved mechanism for effecting projection and retraction movement of the unit between a position in which the point is exposed for writing and a position in which the point is concealed within the casing.

Another object of the invention is to provide a ball-point writing instrument having a projecting and retracting mechanism for moving the point between an exposed writing position and a concealed non-writing position and wherein the user may detach and remove the ink reservoir means for replacement without disturbing the relationship of the parts forming the projecting and retracting mechanism.

Another object of the invention is to provide a ball-point writing instrument having a readily removable and replaceable point-and-cartridge unit mounted in the casing for projection and retraction movement and wherein the unit may be inserted in or removed from the casing by a simple push or pull manipulation and without disconnection or removal of any of the other parts of the instrument.

Another object of the invention is to provide a ball-point writing instrument wherein the writing point is movable between exposed and concealed positions by a simple manipulation of an actuating member and in which the writing element is positively connected to the actuating member and is under the control of the latter throughout its propel and repel movements.

Another object of the invention is to provide a ball-point writing instrument having a mechanism for moving the writing point between an exposed, writing position and a concealed, non-writing position wherein movement of the point is effected only upon positive manipulation of the mechanism through a substantial movement and

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the mechanism is not subject to accidental actuation.

Another object is to provide a simple and sturdy ball-point writing instrument having a point-and-cartridge unit which is readily removable and replaceable and mechanism for effecting projection and retraction action of the unit in the casing to expose or conceal the point, which instrument is easy to manufacture and assemble, and which will operate effectively for a long period of use, without requiring adjustment or repair of the parts.

Other and more specific objects of the invention are to provide a ball-point writing instrument having a projecting and retracting mechanism actuated by a turning movement of a rear end cap about the axis of the instrument; to provide a point-and-cartridge unit which can be removed through the front end of the instrument without disturbing the projecting and retracting mechanism; to provide a simple and quickly detachable connection between a point-and-cartridge unit and a projecting and retracting mechanism; to provide a projecting and retracting mechanism which can be inserted in or removed from the casing as a unit.

Other objects and advantages of the invention will appear from the following description and from the appended drawings, in which:

Figure 1 is a longitudinal sectional view of a writing instrument constructed in accordance with a preferred embodiment of my invention, showing the ball writing point in its forward or projected position;

Fig. 2 is a longitudinal sectional view similar to Fig. 1 but showing the ball writing point in its rearward or retracted position;

Fig. 3 is an enlarged, fragmentary, longitudinal sectional view of a portion of the structure of Fig. 1;

Fig. 4 is a transverse sectional view taken along line 4—4 of Fig. 3;

Fig. 5 is a transverse sectional view taken along line 5—5 of Fig. 3;

Fig. 6 is a longitudinal sectional view of another preferred embodiment of my invention and showing the ball writing point in its forward or projected position;

Fig. 7 is a longitudinal sectional view similar to Fig. 6 but showing the writing point in its rearward or retracted position;

Fig. 8 is an enlarged, fragmentary, longitudinal sectional view of a portion of the structure of Fig. 6, certain of the parts being shown in elevation;

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Fig. 9 is a transverse sectional view taken along line 9—9 of Fig. 8;

Fig. 10 is a transverse sectional view taken along line 10—10 of Fig. 8;

Fig. 11 is a transverse sectional view taken along line 11—11 of Fig. 8; and

Fig. 12 is a fragmentary top plan view of a portion of the structure of Fig. 1.

A preferred embodiment of the invention is illustrated in Figs. 1 to 5 of the drawings. Referring now particularly to Fig. 1, the writing instrument includes a housing or barrel 1 formed with an enlarged bore 1*b* defining a chamber open at its rear end to receive a projecting and retracting mechanism hereinafter described. The forward end 1*c* of the barrel 1 preferably is tapered and is formed with a small bore 1*a* adapted to receive and guide the forward end of a point-and-cartridge unit 3 mounted for axial displacement in the barrel 1. A tip member 2 which may be formed separately from the barrel 1 is secured at its rear end 2*b* to the front end of the body portion of the barrel 1, as by spinning or crimping, and forms a portion of the barrel or housing 1. The tip member 2 has a bore 2*a* through which the point-and-cartridge unit 3 is adapted to project. The tip member 2 preferably is split throughout a substantial portion of its length and is sufficiently resilient so that the walls of the bore 2*a* frictionally but yieldingly engage the point-and-cartridge unit 3 to prevent unintended axial displacement thereof in the barrel 1.

The point-and-cartridge unit 3 includes a generally tubular body 5 defining an ink reservoir adapted to contain a quantity of relatively viscous ink suitable for use with a ball writing element. At its forward end the body 5 is formed with a seat adapted to receive and retain a ball writing element or point 4. Since the details of the ball seat form no part of the present invention, the seat is not illustrated or described in detail; it will be understood, however, that the ball writing element 4 is suitably supported for free rotation in its seat during writing and receives ink from the reservoir in such manner that the writing element functions in the usual manner to apply the ink to the writing surface when the instrument is used in writing.

At its rearward end the point-and-cartridge is releasably received and engaged by a resilient bushing 6 (Fig. 3) preferably formed of a material such as sponge rubber. The bushing 6 is formed with an axial bore 6*a* normally of slightly less diameter than the rearward end of the point-and-cartridge unit 3 and adapted to yieldingly and resiliently receive the latter and retain it against unintentional displacement. In order to assist in guiding the rear end of the unit 3 into the bore 6*a*, the latter may be provided with a flared forward end 6*b*. The bushing 6 is mounted in a cup 7 having an open forward end and a rear wall 7*a* substantially closing the rear end of the cup 7 and providing an abutment for the rear end of the bushing 6 and the unit 3. Thus the cup 7 and bushing 6 together form a holder for the rear end of the point-and-cartridge unit 3. The point-and-cartridge unit 3 may be assembled in the barrel 1 by inserting it through the opening 2*a* in the tip member 2 and the bore 1*a* in the end of the barrel 1 and seating its rear or inner end in the bushing 6. The point-and-cartridge unit 3 may be removed by merely pulling it out of the barrel 1 through the forward end of the latter.

The point-and-cartridge unit and the securing

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means therefor are disclosed and claimed in my copending application Serial No. 610,423, filed August 13, 1945.

The point-and-cartridge unit 3 is mounted in the barrel 1 for projection and retraction movement relative to the barrel between a position wherein the writing element 4 is exposed for writing and a position wherein the writing element is concealed within the barrel. A projecting and retracting mechanism is provided for effecting movement of the point-and-cartridge unit upon a turning movement of an actuating member about the axis of the barrel of the writing instrument.

In carrying out the invention, the cup 7 is mounted on the rear end of a tube 15, preferably by telescoping the forward end of the cup 7 with the rear end of the tube 15, and the cup 7 preferably is secured on the tube 15 as by crimping or spinning the end of the cup into a groove 15*b* formed in the tube 15. The tube 15 forms a part of the propel-repel mechanism and is mounted coaxially with the barrel for rotation about their mutual axis and for axial displacement in the barrel.

A bushing 10 is telescoped into the rear open end of the barrel 1 and is removably but firmly secured in the barrel as by a threaded connection 9 therewith. The bushing 10 is formed forwardly of the threaded connection 9 with a helical slot 11 adapted to receive and guide a stud or projection 16 extending radially outwardly from the tube 15. Upon rotation of the tube 15 about its axis, the stud 16 is caused to advance along the slot 11, forwardly or backwardly, depending upon the direction of rotation of the tube 15, thereby effecting a corresponding axial displacement of the tube 15 in the bushing 10. The bushing 10 is provided with a head or flange 10*a* at its rearward end adapted to abut the rearward end edge of the barrel 1 and thus accurately position the bushing 10.

A sleeve 12 (Fig. 3) is telescopingly interposed between the bushing 10 and the tube 15 and is rotatable in the bushing 10 but held against axial displacement therein. A crescent key 13 (see also Fig. 5) seated in circumferential groove 12*a* in the sleeve 12 and in a complementary arcuate slot 10*b* in the bushing 10 embraces the sleeve through approximately 180° and locks it against axial displacement in the bushing 10. The key 13 is held in place by an arcuate spring band 14 sprung over the bushing 10 and engaging it throughout substantially more than half its circumference. The bore 1*b* of the barrel 1 is enlarged sufficiently adjacent its rear end to receive the spring band 14.

The sleeve 12 is provided with an elongated slot 12*b* extending longitudinally thereof and which slidably receives the projection 16 extending radially from the tube 15. The sleeve 12 thus drivingly engages the projection 16, whereby, when the sleeve 12 is rotated, it effects corresponding rotation of the tube 15. The elongated slot 12*b* permits the projection 16 to be advanced longitudinally of the barrel 1 and along the slot 11 even though the sleeve 12 is firmly held against axial displacement in the barrel 1.

The sleeve 12 preferably is rotated by a cap 17 which serves as an actuating member for the projecting and retracting mechanism. In addition, the cap 17 preferably closes the rear open end of the barrel and serves to house and conceal the rearward portion of the projecting and retracting mechanism and the cup 7. The cap 17

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includes inner and outer members 18 and 19, respectively, which are generally cylindrical in form and are secured together at their forward ends as by welding and are secured together at their rearward ends as by crimping or spinning to a threaded bushing 20 which may be employed to attach a pocket clip 21 (Figs. 1 and 2) of any suitable construction. The inner tubular member 18 is adapted to telescope over and frictionally engage a rearwardly projecting extension 12c of the sleeve 12, whereby the cap 17 is frictionally held in position on the rearwardly projecting portion of the projecting and retracting mechanism and is in driving engagement therewith whereby rotation of the cap effects corresponding rotation of the sleeve 15. The forward end of the tubular member 18 is expanded outwardly to allow it to fit over the head 10a of the bushing 10 and to clear the latter sufficiently to prevent any rubbing between these members when the cap is rotated.

The rear end of the extension 12c is open to the interior of the cap 17 and thus vents the interior of the extension to the interior of the cap 17. The latter may be vented to the atmosphere in any suitable manner but ordinarily will be adequately vented by leakage of air through the bushing 20 at the rear end. Thus air can pass into the cap 17, through the opening 7b in the cap 7, thence through the space 8 and into the tube 5.

In operation the point-and-cartridge unit 3 is projected or retracted to expose or conceal, respectively, the writing element 4 by turning the cap 17 about its axis of the barrel 1. Assuming the unit 3 to be in its retracted position, as illustrated in Fig. 2, when the cap 17 is turned in a clockwise direction (as viewed from the rear end of the instrument), the cap frictionally drives the sleeve 12 thereby to rotate the latter and cause the projection 16 to advance along the slot 11 and project the tubular member 15 carrying the point-and-cartridge unit 3. The writing element 4 is advanced and projected from the barrel (and through the tip member where one is employed in connection with the barrel) into exposed writing position, as illustrated in Fig. 1. With the writing element in projected position, counter-clockwise rotation of the cap 17 will effect a reverse or retracting action of the mechanism to retract the writing element into the barrel and into its concealed, non-writing position.

Means are provided for retaining the writing point 4 in projected position against the pressure applied thereto in writing which tends to urge the writing point 4 (and the unit 3) rearwardly relatively to the barrel 1. This is accomplished in the present invention by so constructing the projecting and retracting mechanism that it cannot be actuated merely by applying pressure on the writing point 4 to retract the unit 3 but is only actuated when the actuating sleeve 12 is turned as by turning the cap 17. A notch 11a (Fig. 12) is provided in the slot 11 into which the stud 13 enters as the mechanism is actuated to propel the unit. The side wall of the notch 11a serves as a stop to limit further movement of the stud 13. The rear wall of the notch 11a serves as an abutment which prevents the stud from being moved rearwardly when pressure is applied to the writing point 4. The notch 11a is so formed that there is no interference with the reverse movement of the stud 13 out of the notch when the mechanism is actuated to propel the unit.

The point-and-cartridge unit 3 may be removed and replaced, whenever desired, as for example, when the ink therein is exhausted, by

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simply propelling it until the forward end can be grasped and then manually withdrawing it through the forward end of the barrel. The unit 3 is held in the barrel merely by the friction exerted by the resilient bushing (assisted to a slight degree by the friction exerted on the unit by the walls of the bore 2a in the tip member), and consequently there are no fastening means which must be uncoupled or disconnected to release the unit 3. A replacement unit similar to the withdrawn unit may be inserted in the barrel by merely guiding the rear end into the bore 2a of the tip and thereafter pushing the unit 3 into the instrument until it enters the bore 6a of the bushing 6 and seats against the end wall 7a. The instrument is then in condition for writing. If for any reason it is desired to remove the projecting and retracting mechanism from the barrel 1, this may be done conveniently by merely removing the cap 17 and unscrewing the bushing 6. The flange 10a provides convenient means which can be grasped by the fingers or by a suitable tool for unscrewing the bushing 6. The projecting and retracting mechanism is formed as a unit carried by the bushing 6 and thus the entire mechanism can be removed as a unit from the barrel 1. The projecting and retracting mechanism may be replaced by screwing it into the barrel in an obvious manner.

There is illustrated in Figs. 6 to 11, inclusive, another embodiment of my invention. In this form of the invention there is employed a point-and-cartridge unit having an ink reservoir of somewhat greater diameter than the reservoir of the embodiment illustrated in Figs. 1 to 5 and which unit is removable through the rear end instead of the front end of the barrel.

Referring now particularly to Fig. 6, the writing instrument includes a barrel 25 which is generally similar to, but preferably somewhat longer, than the barrel of the preferred embodiment. The barrel 25 is formed with an enlarged bore 25b to receive a point-and-cartridge unit 30 and a propel-repel mechanism, both of which are more fully described hereinafter.

The point-and-cartridge unit 30 includes an ink cartridge 27 having an ink reservoir and adapted to contain an ink suitable for use in a ball-point writing instrument, as for example, a relatively thick viscous ink. The cartridge may, if desired, include means (not shown) for continuously maintaining the ink under pressure tending to urge it from the reservoir through a discharge outlet 35a formed in a portion 35 of the cartridge 27. The cartridge 27 includes a coupling member 32 by which it is connected to a feed element 23 having one or more feed passages or channels 23b therein leading from the discharge outlet 35a and into feeding relation with a ball writing element 29 seated at the forward end of the unit 30. The forward end of the unit 30 extends into and is guided in a reduced bore 25a and is adapted to be projected through a bore 26a in a split tip member 26 at the forward end of the barrel 25.

The point-and cartridge unit 30 is mounted for projecting and retracting movement generally similar to the movement of the unit 3 and the mechanism for effecting projecting and retracting the unit 30 is generally similar to that illustrated in Figs. 1 to 5. Accordingly, where the projecting and retracting mechanism illustrated in Figs. 6 to 11 is not described in detail it will be understood that it is similar to the previously described mechanism.

The projecting and retracting mechanism includes a bushing 39 removably secured in the open rear end of the barrel 25, as by screw threads 40. Formed in the forward portion of the bushing 39 is a helical slot 41 which receives and guides a stud or projection 37 extending radially from the point-and-cartridge unit 30 adjacent the rear end thereof. Telescopingly interposed between the bushing 39 and the rear end of the unit 30 and rotatable in the former is a sleeve 42 having an elongated, longitudinally extending slot 42b which slidably receives the stud 37, whereby the sleeve 42 drivingly engages the stud 37. The sleeve 42 is firmly held against longitudinal displacement by a crescent key 43 disposed in a slot 42a in the sleeve 42 and a slot 39c in the bushing 42 and held in place by a spring band 44 sprung into a groove 39a in the bushing 39.

The sleeve 42 extends rearwardly of the bushing 39 and frictionally receives a cap 45 by which the sleeve 42 is rotated; the cap 45 also closes the end of the barrel 25 and incloses the projecting portion of the sleeve 42.

The projecting and retracting action of this embodiment of the invention is generally similar to that of the above described embodiment. If, when the unit 30 is in retracting position, as shown in Fig. 7, the cap 45 is turned in a clockwise direction (as viewed from the rear end of the instrument) the unit 30 is thereby propelled to project the ball-point 29 out of the tip member 26 and into exposed writing position; a reverse movement of the cap 45 causes the unit 30 to be moved into concealed, non-writing position within the barrel 25.

In order that the unit 30 may be removed and replaced, when the ink is exhausted, the unit 30 is removable through the rear end of the barrel 25 and is detachable from the projecting and retracting mechanism. To remove the unit 30, the cap 45 is removed and the bushing 39 is unscrewed from the barrel 25, the unit 30 being withdrawn, along with the projecting and retracting mechanism which latter is removable as a unit. The head 39d provides convenient means for gripping the bushing by the fingers or a suitable tool for unscrewing the bushing. After removal of the bushing 39 and unit 30, the latter may be detached from the former by withdrawing the stud from the slot 41, a straight open-ended slot portion 39b being provided for this purpose.

The rearward extension of the projecting and retracting mechanism on which the end cap is frictionally fitted may be vented adjacent its inner end in order that when the cap is applied or removed (especially where this is done rapidly) no sudden pressure change will result within the instrument tending to "pump" ink. This venting preferably is accomplished by providing one or more vent openings adjacent the inner end of the extending portion of the projecting and retracting mechanism as for example the openings 42a (Fig. 6) in the rearward portion of the sleeve 42. It will be seen that as the cap 45 is moved rearwardly the vent openings 42a are uncovered to vent the interior of the sleeve 42 to atmosphere and relieve the vacuum which tends to be created by the rearward movement of the cap 45.

From the foregoing, it will be seen that this invention provides a ball-point writing instrument wherein by a simple turning movement of the end cap, the writing element can be moved between a retracted position concealed in the barrel and a projected position wherein the writing element

is exposed for writing. The projecting and retracting mechanism is continuously connected in positive driving relation with the point-and-cartridge unit so that the latter is moved smoothly and evenly between projected and retracted positions, while permitting ready detachment of the unit from the projecting and retracting mechanism. A substantial turning movement of the cap is required to project or retract the unit and there is no likelihood of the unit being moved accidentally into either of its positions.

The point-and-cartridge unit is readily removable from the barrel for replacement by a simple operation which can be performed by the user. After replacement of the unit the instrument is in condition for writing and no adjustments are required. In one preferred embodiment of the invention, the unit may be removed and replaced by merely withdrawing the unit through the front end of the barrel and inserting the replacement unit without the necessity for removing the rear end cap.

The projecting and retracting mechanism is readily removable for adjustment or repair if for any reason such is necessary, although, due to the simplicity of the mechanism, the positive connection between the several members and the absence of any critical adjustments, there is little likelihood of the mechanism becoming inoperative and it ordinarily will operate successfully for a long period of use without adjustment, repair, or replacement of parts.

I claim:

1. A ball-point writing instrument comprising a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, housing means for said unit including a barrel, an actuating member mounted for turning movement about the axis of said barrel and having at least a portion exposed for manual manipulation, and means driven by said actuating member for effecting relative movement between said unit and said housing means between a position in which said writing element is exposed for writing and a position wherein said housing means substantially incloses said writing element, respectively.

2. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and actuating means including an actuating member mounted for turning movement about the axis of said barrel for projecting and retracting said unit, respectively.

3. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, an actuating member mounted for turning movement about the axis of said barrel, and means actuated by turning movement of said actuating member in one direction for projecting said unit

and in the opposite direction for retracting said unit, respectively.

4. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, an actuating member, and means continuously connecting said unit to said actuating member for positive driving actuation by said actuating member into projected and retracted positions, respectively.

5. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, an actuating member mounted at the rear end of said barrel for turning movement about the axis of said barrel, and means including a screw drive between said actuating member and said unit and effective upon a turning movement of said actuating member for projecting and retracting said unit, respectively.

6. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit, respectively, including a first actuating element having a helical slot extending therealong, a second actuating element having a stud riding in said helical slot whereby relative rotation of said actuating elements effects relative axial displacement thereof, means connecting one of said actuating elements to said unit and the other of said actuating elements to said barrel, and means for effecting relative rotation of said actuating elements.

7. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit, respectively, including a first actuating element having a helical slot extending therealong, a second actuating element having a stud riding in said helical slot whereby rotation of said actuating elements effects relative axial displacement thereof, means connecting one of said actuating elements to said barrel and the other of said actuating elements to said unit and means including a member interposed between said actuating elements and said stud for effecting relative rotation of said actuating elements.

8. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit includ-

ing an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing, and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit including a bushing secured in said barrel and having a helical slot extending therealong, a stud connected to said unit and riding in said helical slot whereby rotation of said unit in said bushing effects axial displacement of said unit, a sleeve rotatably mounted in said bushing and drivingly engaging said stud, and manually operable means for rotating said sleeve.

9. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing, and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit including a bushing secured in said barrel and having a helical slot therein, a stud connected to said unit and riding in said helical slot whereby rotation of said unit in said bushing effects axial displacement of said unit, a sleeve rotatable in said bushing and drivingly engaging said stud, means retaining said sleeve against axial displacement in said bushing, and manually operable means for rotating said sleeve.

10. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit including a bushing secured in said barrel, and having a helical slot extending therealong, a stud connected to said unit and riding in said helical slot whereby rotation of said unit in said bushing effects axial displacement of said unit, a sleeve rotatably mounted in said bushing and having a longitudinally extending slot therein receiving said stud whereby said sleeve drivingly engages said stud, and manually operable means for rotating said sleeve.

11. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit including a bushing secured in said barrel and having a helical slot therein, a stud connected to said unit and riding in said helical slot whereby rotation of said unit in said bushing effects axial displacement of said unit, a sleeve rotatable in said bushing and drivingly engaging said stud, means including a key interposed between and circumferentially engaging said bushing and said sleeve for retaining said sleeve against longitudinal displacement, retaining said sleeve against

axial displacement in said bushing, and manually operable means for rotating said sleeve.

12. A ball-point writing instrument comprising a barrel having open front and rear ends, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted for projection and retraction movement in said barrel between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means projecting and retracting said unit including a driving element having at least a portion thereof projecting from the open rear end of said barrel and rotatable about the axis of said barrel, and a rotatable cap inclosing said projecting portion of said driving element and in frictional driving engagement therewith.

13. A ball-point writing instrument comprising a barrel having open front and rear ends, a point-and-cartridge unit including an ink reservoir, a ball writing element, and means for feeding ink from said reservoir to said writing element, said unit being mounted for projection and retraction movement in said barrel between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, and means for projecting and retracting said unit including driving means connected to said unit for effecting projection and retraction movement thereof, said driving means being threadedly secured in said barrel with a portion projecting therefrom and being removable as a unit from said barrel, and a rotatable cap inclosing said projecting portion of said driving means and in frictional driving engagement therewith.

14. A ball-point writing instrument comprising a barrel having an open forward end, a point-and-cartridge unit insertable through the open forward end of said barrel, including an ink reservoir, a ball writing element, means mounting said writing element at one end of said unit and means for feeding ink from said reservoir to said writing element, means for mounting said unit in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, means carried by said mounting means and releasably engageable with said unit for detachably connecting said unit to said mounting means, and actuating means for projecting and retracting said unit.

15. A ball-point writing instrument comprising a barrel having an open forward end, a point-and-cartridge unit insertable through said open forward end of said barrel, including an ink reservoir, a ball writing element, means mounting said writing element at one end of said unit and means for feeding ink from said reservoir to said writing element, means mounting said unit in said barrel for projection and retraction move-

ment between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, means carried by said mounting means for receiving and frictionally engaging said unit to detachably connect said unit to said mounting means, whereby said unit may be inserted through the open forward end of said barrel into connecting frictional engagement with said connecting means and may be detached and removed through said open forward end of said barrel, and actuating means for projecting and retracting said unit.

16. A ball-point writing instrument comprising a barrel having an open forward end, a point-and-cartridge unit insertable through said open forward end of said barrel, including an ink reservoir, a ball writing element, means mounting said writing element at one end of said unit and means for feeding ink from said reservoir to said writing element, means for mounting said unit in said barrel for projection and retraction movement between a position wherein said writing element is exposed for writing and a position wherein said writing element is concealed within said barrel, means carried by said mounting means and including a yieldable, resilient element having a socket therein for yieldingly receiving and frictionally gripping the rearward end portion of said unit to detachably connect said unit to said mounting means, whereby said unit may be inserted through the open forward end of said barrel into connecting frictional engagement with said connecting means and may be detached and removed through said open forward end of said barrel, and actuating means for projecting and retracting said unit.

17. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit in said barrel and including an ink reservoir, a ball writing element and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for movement between a position wherein said writing element is exposed for writing and a position concealed in said barrel, a manually operable actuating member, and screw means driven by said actuating member for projecting and retracting said unit.

18. A ball-point writing instrument comprising a barrel, a point-and-cartridge unit in said barrel and including an ink reservoir, a ball writing element and means for feeding ink from said reservoir to said writing element, said unit being mounted in said barrel for movement between a position wherein said writing element is exposed for writing and a position concealed in said barrel, an end cap closing the rear end of said barrel and manually movable relatively to said barrel, and means actuated by movement of said cap relatively to said barrel for projecting and retracting said unit.

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No references cited.