Oct. 14, 1947. R. W. RANDOLPH 2,428,854

WRITING INSTRUMENT

Filed Oct. 1, 1945 2 Sheets-Sheet 1

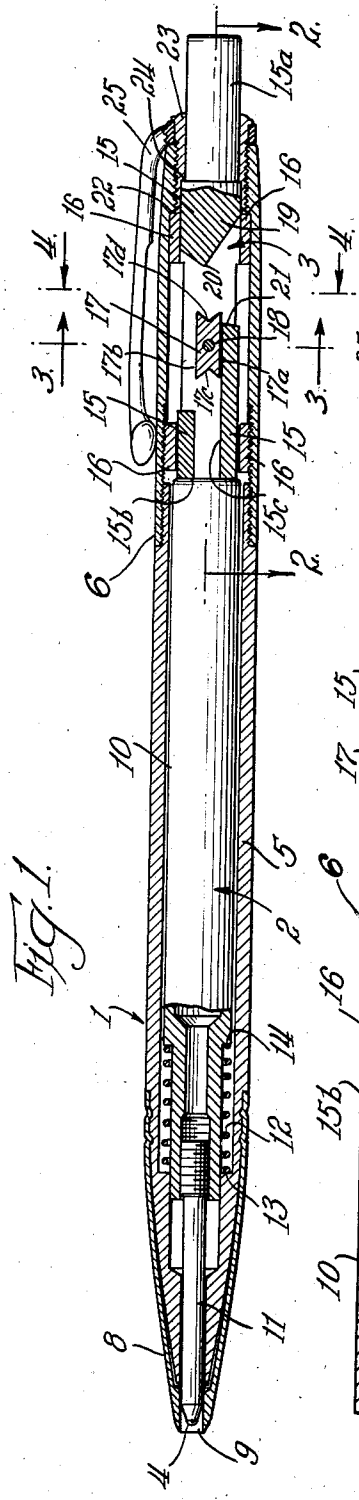


Fig. 1.

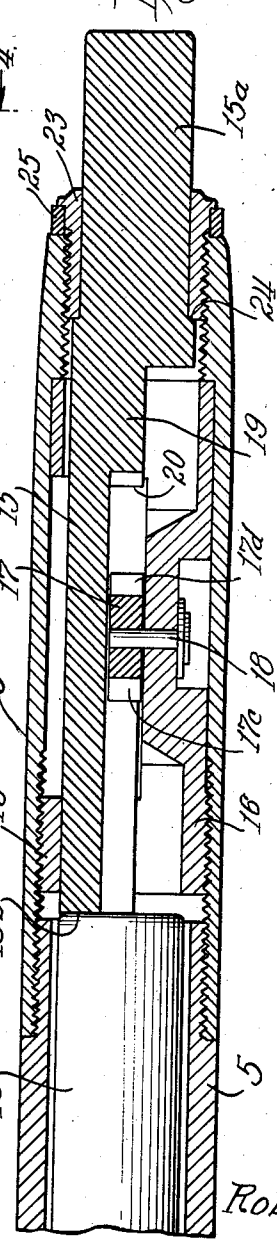


Fig. 2.

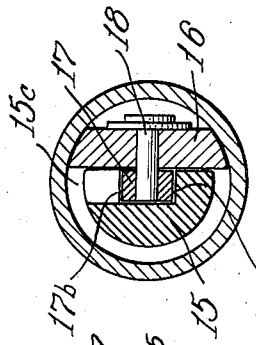


Fig. 3.

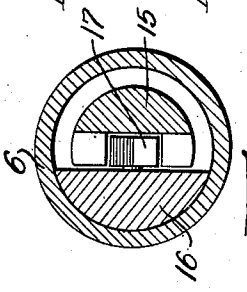


Fig. 4.

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WRITING INSTRUMENT

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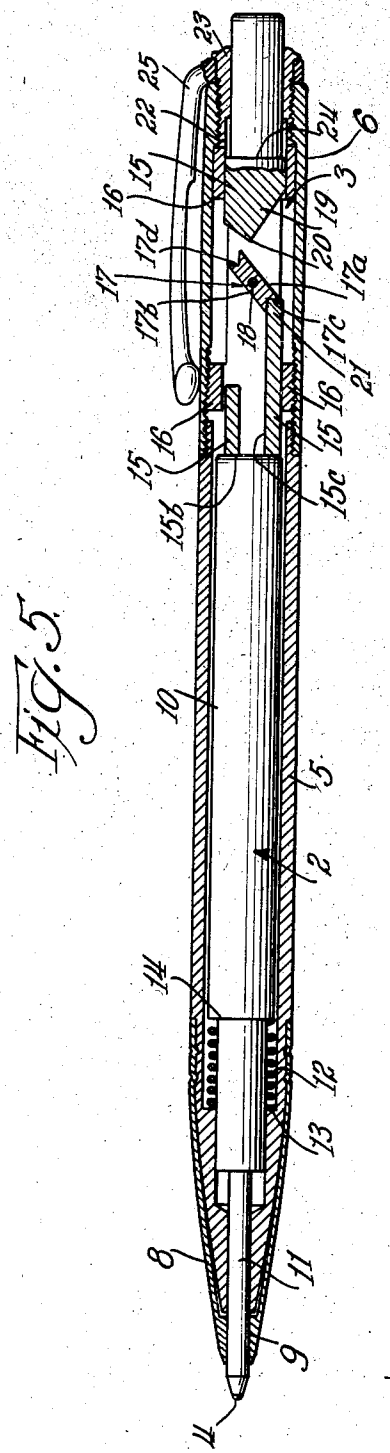


Fig. 5.

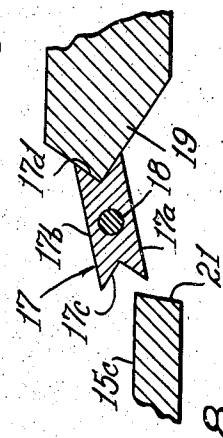


Fig. 6.

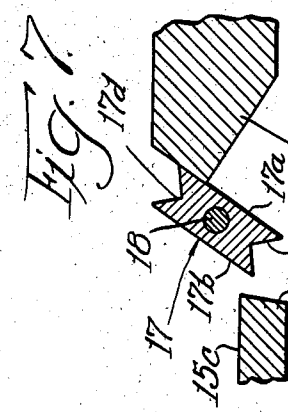


Fig. 7.

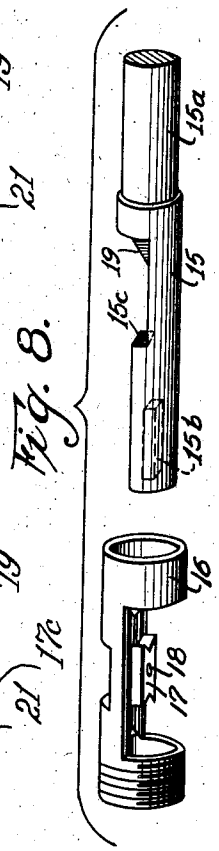


Fig. 8.

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UNITED STATES PATENT OFFICE

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WRITING INSTRUMENT

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Application October 1, 1945, Serial No. 619,528

17 Claims. (Cl. 120—49)

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This invention relates to writing instruments and has for its primary object to provide an instrument of that character wherein the writing point is propellable and retractable, alternately, out of and into the front end of the holder by repeatedly depressing a pushbutton which preferably projects from the back end of the holder.

A more specific object is to provide a ball-point writing instrument comprising a replaceable self-contained ball-and-cartridge unit mounted in a holder together with mechanism which operates in response to successive push-button operations alternately to propel and retract the writing point.

A further object is to provide a writing instrument of the kind above indicated wherein the component parts are of sturdy design and susceptible of trouble-free, economical mass production and which can easily and quickly be assembled and disassembled.

Still another object is to devise a writing instrument of the aforementioned character wherein the entire propelling and latching mechanism is contained in a cap member which is detachable as a whole for the purpose of removing and replacing the ball-and-cartridge unit, and which can be withdrawn from the remainder of the holder without disassembling the propelling and retracting mechanism or causing any maladjustment thereof.

In the drawing which accompanies this specification:

Fig. 1 is a longitudinal sectional view showing a ball-point writing instrument according to this invention, with the writing point in the retracted position;

Fig. 2 is a longitudinal sectional view taken along the line of 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a longitudinal sectional view similar to Fig. 1, showing the writing point of the instrument in its projected position and the propelling and retracting mechanism in its corresponding posture;

Fig. 6 is a diagram illustrating an intermediate step in the operation of the propelling and retracting mechanism which occurs while the writing point is being propelled from the retracted position shown in Fig. 1 to the projected position of Fig. 2;

Fig. 7 is a diagram illustrating another intermediate step in the operation of the propelling and retracting mechanism, which occurs as an incident to retraction of the writing point; and

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Fig. 8 is an exploded perspective view of a portion of the propelling and latching mechanism.

The device illustrated is a ball-point writing instrument and comprises, as major elements, a holder 1, a ball-and-cartridge unit 2 and a mechanism 3 which function in response to successive push button operations to effect propulsion of the unit 3 to project the ball point 4 from the holder 1 for writing and latch the unit in propelled position and alternately to release the unit 3 for retraction as hereinafter described.

The principal parts of the holder are a tubular barrel 5 and a cap 6 which is threaded onto the back end of barrel 5 and is detachable therefrom by unscrewing. The front end of barrel 5 is tapered as shown and provided with a metal tip member 8 having an axial bore 9 through which the ball point 4 is movable outwardly and back.

Ball-and-cartridge unit 2 is a self-contained element, removable as a whole from the barrel, and comprises an elongate ink reservoir 10 to which is attached a tubular stem 11 through which there is an ink passageway connecting reservoir 10 with the back surface of ball point 4. A coil spring 12 bears, on the one hand, against a shoulder 13 within the barrel and, on the other hand, against a shoulder 14 formed on the ball-and-cartridge unit and continuously urges said unit toward the retracted position depicted in Fig. 1. When cap member 6 is detached from the barrel the ball-and-cartridge unit together with spring 12 will readily drop out and can easily be replaced.

The mechanism 3 is all contained within cap member 6 and remains in place with its adjustment undisturbed when the cap member is unscrewed from the barrel.

The principal components of mechanism 3 are a plunger 15, having an integral pushbutton portion 15a, a sleeve or bushing 16 in which said plunger is slidable longitudinally and a latch member 17 having a pivot 18 which is journaled in sleeve 16, as illustrated in Fig. 3. The front end 15b of plunger 15 abuts the back end of ball-and-cartridge unit 2. Hence, when push-button 15a is depressed the plunger pushes the ball-and-cartridge unit forwardly thus causing the ball point to be propelled out of the retracted

position of Fig. 1 to the projected position of Fig. 5.

It is to be observed that latch 17, being pivotally mounted on sleeve 16, does not move forward and back with the plunger but instead remains stationary, except that it rotates in step-by-step fashion, as will be explained later, in response to successive longitudinal movements of the plunger.

Latch member 17 is a small steel block or bar of rectangular cross-section, see Fig. 3, having two parallel sides 17*a* and 17*b* equidistant laterally from the pivotal center. The two ends of latch member 17 are, respectively, V-notched as indicated at 17*c* and 17*d*. Plunger 15 is formed to present a guide surface 15*c* which lies adjacent one of the two parallel sides of the latch member and serves to prevent rotation of said latch member when the same is in the posture illustrated in Fig. 1 and said plunger is in its retracted position as shown in the same figure.

Formed as an integral part of plunger 15 is a lug 19 having a V-shaped front face the apex 20 of which points toward latch member 17 and is somewhat laterally displaced from the center of pivot 18.

Assuming that the mechanism under discussion occupies the posture illustrated in Fig. 1—which may be called the retracted posture—a forward movement of the plunger caused by depressing pushbutton 15*a* will result in a forward movement of lug 19 and at the same time a forward movement of guide surface 15*c* as illustrated in Fig. 6. The nose of lug 19 strikes latch member 17 off center and rotates the later counterclockwise to the position exhibited in Fig. 6. Due to V-notch 17*d* lug 19 can move no farther in the forward direction, but with the latch member rotated to the posture shown in Fig. 6 the latter is in a position to be engaged by shoulder 21 upon the return movement of the plunger which results from release of pushbutton 15*a*. Upon said return movement of the plunger shoulder 21 seats itself in notch 17*c* as illustrated in Fig. 5 and the plunger is thus prevented by the latch member from returning to the fully retracted position of Fig. 1. The plunger is thus held in a position, Fig. 5, which is partially retracted from its most forward position and in which it holds the writing point of the instrument in a projected position far enough out of the holder 1 to be exposed for writing.

As will be apparent from inspection of Fig. 5 a successive forward movement of the plunger caused by depressing the pushbutton will cause shoulder 21 to disengage the latch member and clear the same while at the same time the nose of lug 19 will engage and further rotate latch member 17 as depicted in Fig. 7. Subsequent release of the pushbutton will cause shoulder 21 to engage and further rotate latch member 17 and restore it to the posture in which it is illustrated in Fig. 1.

It will be seen that latch member 17 has two principal resting postures. One of these, which may, for convenience, be identified as the first resting posture is illustrated in Fig. 1. The other, which may be identified as the second resting posture, is illustrated in Fig. 5. The postures in which the latch member is illustrated in Figs. 6 and 7 are merely intermediate postures which in normal operation it occupies but momentarily.

The forward end of sleeve 16 is threaded into cap member 6 and its back end abuts a shoulder 22 formed in the cap member. Threaded into the back end of cap member 6 is a bushing 23 which provides a bearing for pushbutton 15*a* and at the same time provides a shoulder 24 which functions as a stop to limit the backward movement of the plunger. A pocket clip 25 is secured in place by a head flange on bushing 23.

As will be apparent, the construction of this writing instrument is such that all the parts thereof are both sturdy and economical to manufacture, and the assembling operation is exceedingly simple.

Manifestly the structure illustrated represents only one of many possible embodiments within the scope and purview of the present invention.

I claim:

1. In a writing instrument, a hollow elongate holder, an actuated element mounted within and reciprocable lengthwise of said holder, said actuated element having a writing point at its front end, said holder having a front opening through which said writing point is propellable out of and alternately retractable into said holder in response to forward and back movements, respectively, of said actuated element, a plunger mounted within the back end portion of said holder and having a pushbutton normally projecting outwardly from the back end of the holder, said plunger being reciprocable lengthwise of said holder, spring means continuously urging said actuated element toward its retracted position, means limiting the backward movement of said plunger, and a latch having two alternate postures, said latch being positioned in one of its said postures to engage said plunger and restrain said actuated element against retraction, and ineffective in its alternate posture to prevent retraction of said actuated element, said plunger being operative upon each forward movement to propel said actuated element forwardly and further operative during each forward movement to switch said latch from the posture it happens to be assuming to its alternate posture.

2. In a writing instrument, a holder comprising a hollow elongate barrel and a hollow elongate cap member detachably connected to the back end of said barrel and forming an extension thereof, an actuated element mounted within and reciprocable lengthwise of said barrel, said actuated element being withdrawable as a unit from the back end of said barrel when said cap member is detached and having a writing point at its front end, said barrel having a front opening through which said writing point is propellable out of and alternately retractable into said barrel in response to forward and back movements, respectively, of said actuated element, a plunger mounted within said cap member and having a pushbutton normally projecting outwardly from the back end of said cap member, said plunger being reciprocable lengthwise of said holder, spring means continuously urging said actuated element toward its retracted position, means limiting the backward movement of said plunger, and a latch within said cap member having two alternate postures, said latch being effective in one of its said postures to restrain said plunger against full retraction and ineffective in its alternate posture to prevent full retraction of said plunger, said plunger being operative upon each forward movement to propel said actuated element forwardly and further operative during each forward movement to switch said latch from the posture it then happens to be assuming to its alternate posture, said cap member, plunger and latch forming a self-contained

unit which is removable as a whole from said barrel.

3. In a writing instrument, a hollow elongate holder, an actuated element mounted within and reciprocable lengthwise of said holder, said actuated element having a writing point at its front end, said holder having a front opening through which said writing point is alternately propellable out of and retractable into said holder in response to forward and back movements, respectively, of said actuated element, a plunger mounted within the back end portion of said holder and having a pushbutton normally projecting outwardly from the back end of the holder, said plunger being reciprocable lengthwise of said holder, spring means continuously urging said actuated element toward its retracted position, means limiting the backward movement of said plunger, and a latch rotatable about a relatively fixed pivot in said casing and having two alternate resting postures of rotation, said latch being effective in one of its two resting postures to block said actuated element against restoration to its fully retracted position following a forward movement of said actuated element produced by said plunger and ineffective in its alternate resting posture to block retraction of said actuated element, said plunger being operative in response to each consecutive forward movement thereof to propel said actuated element forwardly against the opposition of said spring means and further operative in response to each such forward movement to rotate said latch from the resting posture it then happens to be assuming to the alternate resting posture.

4. In a writing instrument, a hollow elongate holder having a longitudinal axis, an actuated element mounted within and reciprocable lengthwise of said holder, said actuated element having a writing point at its front end, said holder having a front opening through which said writing point is alternately propellable out of and retractable into said holder in response to forward and back movements, respectively, of said actuated element, a plunger mounted within the back portion of said holder and having a pushbutton projecting outwardly from the back end of said holder, said plunger being reciprocable lengthwise of said holder and operative to propel said actuated element forwardly, a centrally pivoted latch member having two parallel sides and two opposite V-notched ends, said latch member being rotatable about its pivot, said plunger being movable lengthwise of the holder relatively to said latch member, said plunger having a guide surface extending parallel to said longitudinal axis, which guide surface is effective in cooperation, one at a time, with the two aforementioned parallel sides of said latch member to hold said latch member in a first posture wherein its said parallel sides are parallel to said longitudinal axis when said plunger is in its fully retracted position, said plunger having a V-shaped lug the apex of which points forwardly toward said latch member, said apex being laterally displaced relatively to said latch pivot, said lug being operative in response to a first forward movement of said plunger to engage and rotate said latch member out of said first posture into a second predetermined posture wherein said latch member is operative to prevent full retraction of said plunger and actuated element, said guide surface being proportioned to clear said latch member during said first forward movement of the plunger, thus enabling said latch member to rotate from its first posture to its second posture, said plunger having a shoulder which is engageable by one of the V-notched ends of said latch member to block full retraction of said actuated element when said latch member is in its said second posture, said lug being operative further to rotate said latch member in response to a second forward movement of said plunger whereby said latch member is restored to its first posture and said actuated element is allowed fully to retract, upon release of said plunger following said second forward movement.

5. A writing instrument in accordance with claim 3 having a stationary sleeve mounted in the back end of said holder and functioning as a guide for said plunger, said latch member being pivoted to said guide.

6. A writing instrument in accordance with claim 4 characterized in that the V-notch engaged by the V-shaped lug cooperates therewith during the first forward movement of the plunger to definitely position said latch member rotatively so that the other V-notch is properly positioned to engage said shoulder.

7. A writing instrument in accordance with claim 3 characterized in that the holder comprises a detachable cap member forming the back end thereof and in which are assembled said sleeve and plunger, said actuated element being withdrawable from said holder following removal of said cap member.

8. In a ball-point writing instrument, a casing, a unit including an ink cartridge and a ball writing point mounted in said casing for longitudinal shift movement, and means mounted in said casing for propelling said unit to project said writing point beyond the forward end of said casing for writing purposes and for retracting it within said casing which means includes a depressible push button in the rear end of said casing in propel engagement with said unit and adapted on a first depression thereof to propel said unit to its projected position, spring means constantly urging said unit toward its retracted position, latching means between said casing and one of said casing mounted parts for holding the latter in its projected position when it has been moved there by said push button, and means fixedly carried by and movable with said push button and operable on a second depression of said push button to render said latch means inactive and hold it inactive while said unit is moved toward its said retracted position by said spring means.

9. A ball-point writing instrument comprising a barrel, a ball-and-cartridge unit including an ink reservoir containing a relatively viscous ink, a ball-point 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 forward propelled position wherein said writing element projects from the forward end of said barrel and is exposed for writing and a rearward retracted position wherein said writing element is concealed within said barrel, means resiliently urging said ball-and-cartridge unit into retracted position, means including a depressible push member for propelling said ball-and-cartridge unit upon a first depression of said push member and movable simultaneously with said ball-and-cartridge unit between propelled and retracted positions of said ball-and-cartridge unit, means for releasably holding said ball-and-cartridge unit in propelled position, and releasing means operative upon a further depression of said push member for

rendering said holding means inactive and maintaining said holding means inactive during the simultaneous movement of said ball-and-cartridge unit and said push member toward said retracted position, said releasing means being engageable with said holding means upon a depression of said push member when said holding means is in inactive position, to return said holding means to active position.

10. A ball-point writing instrument comprising a barrel, a ball-and-cartridge unit including an ink reservoir containing a relatively viscous ink, a ball-point 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 forward propelled position wherein said writing element projects from the forward end of said barrel and is exposed for writing and a rearward retracted position wherein said writing element is concealed within said barrel, means for resiliently urging said ball-and-cartridge unit into retracted position, means including a depressible push member for propelling said ball-and-cartridge unit upon a first depression of said push member and for controlling return of said ball-and-cartridge unit to retracted position, means for releasably holding said ball-and-cartridge unit in propelled position, and releasing means active upon a further depression of said push member for rendering said holding means inactive and maintaining said holding means inactive as said ball-and-cartridge unit is moved toward retracted position by said urging means, said releasing means being engageable with said holding means upon a depression of said push member when said holding means is in inactive position, to return said holding means to active position.

11. A ball-point writing instrument comprising a barrel open at its opposite ends, a pen unit slidably mounted in said barrel and having a ball writing point at its forward end adapted to be propelled and retracted through the forward end of the barrel, spring means constantly urging said unit toward a retracted position wherein said writing point is concealed within the barrel, a push member slidably mounted in the barrel in drive engagement with the inner end of said unit and having an exposed push element projecting through the opening in the rear end of the barrel, latch means for latching and holding said unit in a propelled position, and holding means carried by said push member and engageable with said latch means upon a first depression of said push member for setting said latch means to hold said unit in its propelled position and for releasing said latch means upon a second depression of said push member to permit said spring means to move said unit to its retracted position.

12. A ball-point writing instrument comprising a barrel, a ball-and-cartridge unit including an ink reservoir containing a relatively viscous ink, a ball-point writing element, and means for feeding ink from said reservoir to said writing element, means mounting said unit in said barrel for movement between a forward propelled position wherein said writing element projects from the forward end of said barrel and is exposed for writing and a rearward retracted position wherein said writing element is concealed within said barrel, a plunger member operably disposed in said barrel in push relation to said ball-and-cartridge unit and having a latching shoulder thereon, a push element at the end of said plunger

member and having at least a portion projecting from said barrel, means resiliently urging said ball-and-cartridge unit toward its retracted position, means including a latch in said barrel positioned to engage said latching shoulder for releasably holding said ball-and-cartridge unit in propelled position, a latch-release and setting element fixedly carried by said plunger member and movable thereby into engagement with said latch for disengaging said latch from said latching shoulder and releasing said latch for retractive movement of said ball-and-cartridge unit by said resilient means.

13. A ball-point writing instrument comprising a barrel including separable, detachably connected, forward and rearward sections, a unit slidably and removably mounted in said forward barrel section and substantially enclosed thereby, said unit including an ink reservoir, a ball writing point adapted to be propelled and retracted through the forward end of said barrel, and means for feeding ink from said reservoir to said writing point, and an actuating mechanism for propelling and retracting said unit carried by and substantially enclosed in said rearward barrel section, and disposed to operatively engage said unit when said barrel sections are assembled, said actuating mechanism being separable from said unit merely upon separating movement of said barrel sections.

14. A ball-point writing instrument comprising a barrel including separable, detachably connected, forward and rearward sections, a unit slidably and removably carried in said barrel and terminating rearwardly adjacent the juncture of said forward and rearward barrel sections, said unit including an ink reservoir, a ball writing point adapted to be propelled and retracted through the forward end of said barrel, and means for feeding ink from said reservoir to said writing point, means yieldingly urging said unit toward retracted position, and manually operable actuating means carried in said rearward barrel section for propelling said unit, holding it in propelled position, and releasing it to permit said retracting means to move it to retracted position, said actuating means being disposed to operatively engage said unit when said barrel sections are assembled, and being separable from said unit merely upon separating movement of said barrel sections.

15. A ball-point writing instrument comprising a barrel including separable, detachably connected, forward and rearward sections, a unit slidably and removably mounted in said barrel and terminating adjacent the rearward end of said forward barrel section, said unit including an ink reservoir, a ball writing point adapted to be propelled and retracted through the forward end of said barrel, and means for feeding ink from said reservoir to said writing point, spring means constantly urging said unit toward retracted position, a depressible push button, and means carried by said rearward barrel section operable upon a first depression of said push button for propelling said unit and releasably holding it in propelled position and operable upon a second depression of said push button for releasing said unit for movement toward retracted position, said last-named means terminating adjacent the forward end of said rearward barrel section in position to engage in driving relation with said unit when said barrel sections are assembled and being separable therefrom merely upon separation of said barrel sections.

16. A ball-point writing instrument comprising a barrel including detachably connected forward and rearward sections, a unit slidably and removably carried in said barrel and terminating adjacent the rearward end of said forward barrel section, said unit including an ink reservoir, a ball writing point adapted to be propelled and retracted through the forward end of said barrel, and means for feeding ink from said reservoir to said writing point, means in said forward barrel section yieldingly urging said unit toward retracted position, depressible propelling means terminating adjacent the forward end of said rearward barrel section in position to be brought into operative driving relation with said unit when said barrel sections are assembled for propelling said unit, means for releasably holding said unit in propelled position, when moved thereto by said propelling means, and means for releasing said holding means to permit said retracting means to return said unit to retracted position, said propelling, holding, and releasing means being carried by said rearward barrel section and separable therewith as a unitary structure from said unit and said forward barrel section merely upon separation of said barrel sections.

17. A ball-point writing instrument comprising a barrel including detachably connected forward and rearward sections, a unit slidably and removably carried in said barrel and including an ink reservoir, a ball writing point adapted to be propelled and retracted through the forward end of said barrel, and means for feeding ink

from said reservoir to said writing point, retracting means in said forward barrel section yieldingly urging said unit toward retracted position, propelling means including a depressible push button and operable upon a first depression thereof for propelling said unit, latch means for releasably holding said unit in propelled position when moved thereto by said propelling means, and releasing means operable upon a second depression of said push button to release said latch means and permit said retracting means to move said uint to retracted position, said propelling means terminating adjacent the forward end of said rearward barrel section in position to engage said unit in driving relation when said barrel sections are assembled and said propelling, holding, and releasing means forming with said rearward barrel section a unitary structure separable from said unit and said forward barrel section merely upon separation of said barrel sections.

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