Dec. 25, 1956 H. W. SAMS 2,775,229

BALL POINT PEN AND RETRACTING MEANS THEREFOR

Filed Aug. 14, 1953

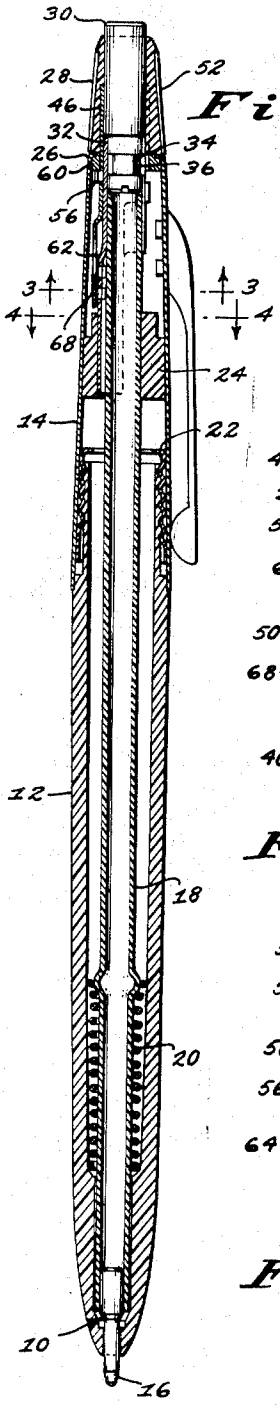


Fig. 1

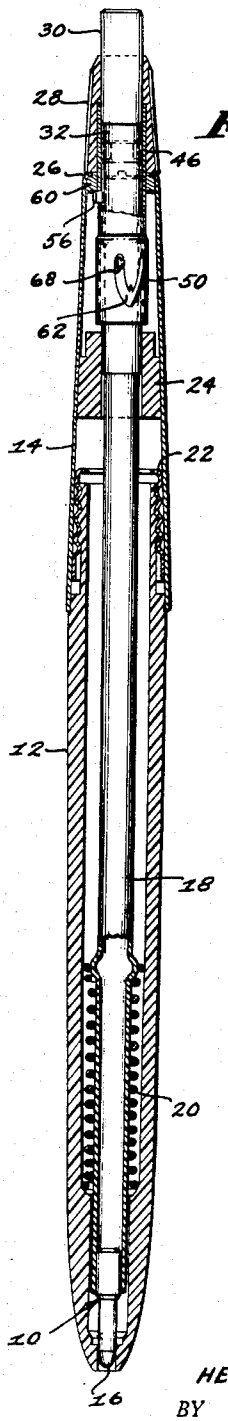


Fig. 2

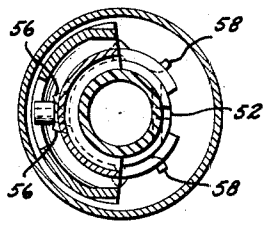


Fig. 3

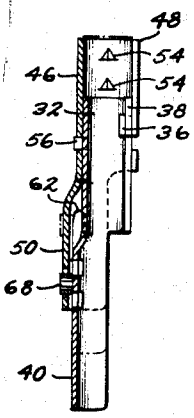


Fig. 5

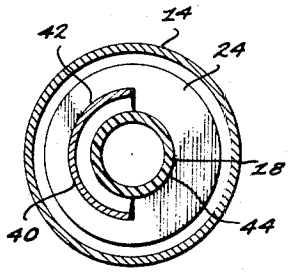


Fig. 4

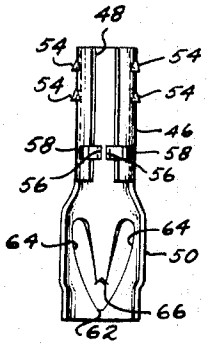


Fig. 6

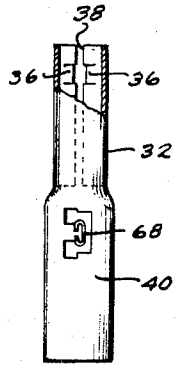


Fig. 7

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United States Patent Office

2,775,229

Patented Dec. 25, 1956

2,775,229

BALL POINT PEN AND RETRACTING MEANS THEREFOR

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Application August 14, 1953, Serial No. 374,393

4 Claims. (Cl. 120—42.03)

This invention relates to ball point pens, and more particularly to an improved retracting means by which the ball point unit for a pen of this sort may be selectively projected for writing or retracted within the pen barrel when not in use.

The retracting means provided according to the present invention may be briefly characterized as incorporating an operating plunger slidably disposed within a tubular operating cap that is mounted for rotation at the rear end of the pen barrel, with the plunger and cap interrelated so that depression of the plunger means associated with the cap operates to latch the plunger at a forward position resulting in projection of the ball point unit for writing, and rotation of the cap results in releasing the depressed plunger for return to its original rearward position at which the ball point unit is retracted within the pen barrel.

The present invention is described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is a vertical section of a ball point pen incorporating a retracting means arranged according to the present invention, the ball point unit being shown in projected position;

Fig. 2 is a generally similar vertical section rotated 90° as seen from the left in Fig. 1, and with the ball point unit shown in retracted position;

Fig. 3 is a transverse section taken substantially on the line 3—3 in Fig. 1;

Fig. 4 is a transverse section taken substantially on the line 4—4 in Fig. 1;

Fig. 5 is an enlarged detail in section of the plunger push tube and cap cam tube taken alone as seen in Fig. 1;

Fig. 6 is an elevation of the cap cam tube taken alone as seen from the right in Fig. 5; and

Fig. 7 is an elevation, partly in section, of the plunger push tube taken alone as seen from the left in Fig. 5.

Referring now in detail to the drawings, and more particularly at first to Figs. 1 and 2, a ball point and reservoir unit is indicated generally by the reference numeral **10** housed within a two-part barrel formed by a forward barrel portion **12** and a rear barrel portion **14**. The forward barrel portion **12** forms the writing end of the pen and mainly houses the ball point unit **10** which consists of a ball point element **16** fitted within the forward end of an ink reservoir **18** that extends rearwardly for substantially the full length of the two-part barrel formed by the forward and rear portions **12** and **14**. A compression coil spring **20** is arranged within the forward barrel portion **12** to engage the ink reservoir **18** so that the ball point unit is yieldably biased at all times rearwardly towards its retracted position.

The forward barrel portion **12** is adapted for assembly with the rear barrel portion **14** by an externally threaded portion of reduced diameter adjacent its rear end that is arranged to engage a threaded sleeve fitted inside the forward end of the rear barrel portion **14**. Intermediately of its length the rear barrel portion **14** is further fitted

with an alignment sleeve **24**, and is formed with an inwardly extending annular flange **26** at its rear end.

The previously mentioned tubular operating cap is indicated in the drawings by the reference numeral **28** and the operating plunger by the reference numeral **30**. As shown, the plunger **30** is slidably disposed within the tubular cap **28** and projects rearwardly therefrom, while carrying at its forward end a push tube **32** that extends forwardly for sliding movement within the alignment sleeve **24**. The plunger **30** is reduced in diameter adjacent its forward end to receive the push tube **32**, and has a circumferential groove **34** in this reduced portion to engage inwardly formed ears **36** on the push tube **32** and thereby secure this tube **32** on the plunger **30**.

The portion of the push tube **32** adjacent the plunger **30** is fully tubular except for a longitudinal slot **38** therein, and on each side of which the above mentioned inwardly formed ears **36** are arranged. Beyond this adjacent fully tubular portion, however, the major part of the extending length of the push tube **32** is semicircular in cross section, as at **40**, this semicircular portion **40** being disposed oppositely to the push tube longitudinal slot **38** and being of enlarged diameter in relation to the adjacent fully tubular portion thereof.

In order to receive this extending semicircular push tube portion **40**, as previously mentioned, the alignment sleeve **24** is formed with a bore in which one half, as at **42**, has a diameter corresponding to the external diameter of the semicircular push tube portion **40**, and the other half, as at **44**, has a diameter corresponding to the internal diameter of the fully tubular portion of the push tube **32**. By this arrangement, the alignment sleeve **24** is not only adapted to receive the extending semicircular push tube portion **40** for sliding movement, but also to prevent rotation of the push tube **32** and thereby maintain its sliding movement aligned within the rear barrel portion **14**. In addition, it should be noted that the ink reservoir **18** of the ball point unit **10** extends rearwardly to be received within the fully tubular portion of the push tube **32** in abutting relation at the bottom face of the plunger **30**, and that as the smaller bore half **44** in the alignment sleeve **24** corresponds in diameter with the internal diameter of this portion of the push tube **32**, the alignment sleeve further serves to align and support the sliding movement of the reservoir **18** during projection and retraction of the ball point pen.

The tubular operating cap **28** in turn carries a cam tube **46** extending forwardly in adjacent surrounding relation with respect to the push tube **32**. The cam tube **46**, like the push tube **32**, is also formed with a fully tubular portion except for a longitudinal slot **48** adjacent the tubular cap **28** and with an extending semicircular portion **50** of enlarged diameter extending in relation to the semicircular push tube portion **40**.

The lower portion of the tubular operating cap **28** is formed with a bore of enlarged diameter to receive the tubular portion of the cam tube **46**, and has a longitudinal rib formed therein as at **52** fitting the longitudinal cam tube slot **48** so as to key the cam tube **46** against rotation in relation to the tubular cap **28**. Also, the tubular portion of the cam tube **46** is formed at the part received within the enlarged bore of the tubular cap **28** with at least one slit boss **54** having the slit edge thereof formed downwardly so as to grip this bore against removal of the cam tube **46** from the tubular cap **28**. In addition, the cam tube **46** provides for assembling the tubular operating cap **28** for rotation on the rear barrel portion **14** by means of outwardly formed ears as at **56** and **58** arranged to extend beneath a washer **60** seated below the rear annular barrel flange **26** and extending therethrough in abutting relation against the bottom face of the tubular operating cap **28**.

The extending semicircular cam tube portion **50** is formed with a cam slot **62** that is shaped with two symmetrical leg portions **64** curving or spreading rearwardly from a forwardly facing central notch **66**. The semicircular push tube portion **40** is in turn formed with a lateral cam lug **68** positioned in following relation within the cam slot **62**. As a result, depression of the operating plunger **30** results in interaction between the cam lug **68** and cam slot **62** so that the cam tube **46** is rotated as the plunger **30** and push tube **32** move downwardly to the bottom of slot **62**, directly below notch **66**, from which location spring **20** will urge the cam lug **68** to move into latching relation with the central cam slot notch **66**, and at which latched position the ball point unit **10** is held forwardly in projected position. Upon rotation of the tubular operating cap **28** in either direction, however, the push tube cam lug **68** is displaced readily from the notch **66** to move freely within one or the other of the cam slot leg portions **44** and thereby release the push tube **32** and plunger **30**, together with the ball point unit **10**, for return to retracted position under the bias of the spring **20** engaging the ink reservoir **18**.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. In a ball point pen, a rear barrel portion having a retracting means assembled therewith, said retracting means comprising a tubular operating cap mounted externally at the rear end of said barrel portion for rotation, an alignment sleeve fixed within said barrel portion intermediate the length thereof, a plunger slidably disposed within said cap and projecting rearwardly therefrom, a push tube carried by said plunger and extending forwardly therefrom for sliding movement within said alignment sleeve, said push tube being keyed against rotation in said alignment sleeve, and a cam tube fixed on said cap and extending forwardly therefrom adjacent said push tube, said cam tube being formed with a cam slot shaped with two symmetrical leg portions spreading rearwardly from a forwardly facing central notch, and said push tube being formed with a lateral cam lug portion positioned in following relation within said cam slot, whereby latching of said cam lug portion at said cam slot notch results upon forward movement of said plunger and rotation of said cap results in displacing said lug portion from said notch.

2. In a ball point pen, the structure defined in claim 1 and further characterized in that said tubular operating cap is formed with an enlarged bore at the forward portion thereof to receive said cam tube, said enlarged bore is formed with a longitudinal rib, and said cam tube is formed at the portion received in said bore with a longitudinal slot for keyed engagement with said rib and with at least one outwardly formed slit boss having the slit edge thereof facing downwardly and thereby gripping said bore against removal of said cam tube.

3. In a ball point pen, a rear barrel portion having a retracting means assembled therewith, said retracting means comprising a tubular operating cap mounted externally at the rear end of said barrel portion for rotation, an alignment sleeve fixed within said barrel portion intermediate the length thereof, a plunger slidably disposed within said cap and projecting rearwardly therefrom, a push tube carried by said plunger and extending forwardly therefrom for sliding movement within said alignment sleeve and having an arcuate extension of enlarged diameter with a portion of said extension cut away, said alignment sleeve being formed with a bore having at least two portions of different diameters, the larger diameter portion corresponding to the external diameter of said arcuate extension, thereby keying said push tube against rotation in said alignment sleeve, and a cam tube fixed on said cap and extending forwardly therefrom adjacent said push tube, said cam tube being formed with a cam slot shaped with two symmetrical leg portions spreading rearwardly from a forwardly facing central notch, and said push tube being formed with a lateral cam lug portion positioned in following relation within said cam slot, whereby sliding movement of said plunger and push tube in the direction faced by said notch results in disposing said cam lug in latching relation with said notch and rotation of said operating cap in either direction with respect to said plunger results in displacing said cam lug from said notch and releasing said plunger for sliding movement within one of said leg portions thereby retracting said plunger and said push tube.

4. In a ball point pen, a rear barrel portion having a retracting means assembled therewith, said retracting means comprising a tubular operating cap mounted externally at the rear end of said barrel portion for rotation relative to said barrel, an alignment sleeve fixed within said barrel portion intermediate the length thereof, a plunger slidably disposed within said cap and projecting rearwardly therefrom, a push tube fixedly secured to said plunger for movement therewith and extending forwardly therefrom for sliding movement within said alignment sleeve, said push tube being keyed against rotation in said alignment sleeve thereby preventing rotation of said plunger, and a cam tube fixedly secured to said cap for rotation therewith and extending forwardly therefrom adjacent said push tube, said cam tube extending around the rearward end of said push tube and the forward end of said plunger, said cam tube being formed with a cam slot having a notch therein facing in a direction of sliding movement of said plunger and push tube and having two symmetrical leg portions curving from each side of said notch in the opposite direction, said push tube being formed with a lateral cam lug portion positioned in following relation within said slot, whereby sliding movement of said plunger and push tube in the direction faced by said notch results in disposing said cam lug in latching relation with said notch and rotation of said operating cap in either direction with respect to said plunger results in displacing said cam lug from said notch and releasing said plunger for sliding movement within one of said leg portions thereby retracting said plunger and said push tube.

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