Jan. 8, 1957 W. B. SPATZ 2,776,646

BALL POINT PEN

Filed Sept. 22, 1952

Fig. 1

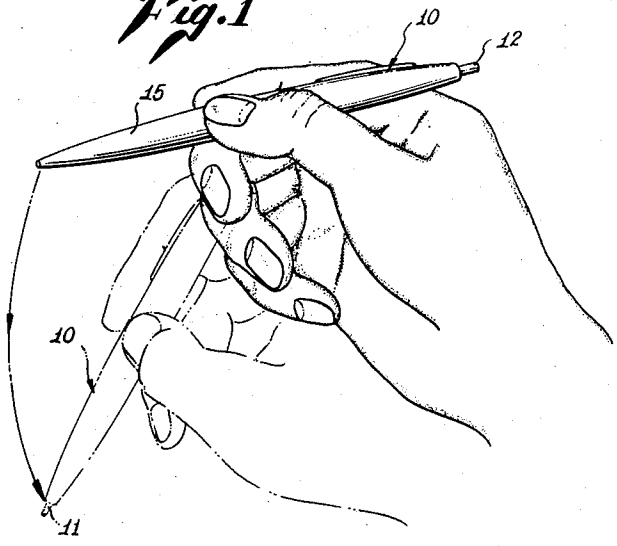


Fig. 2

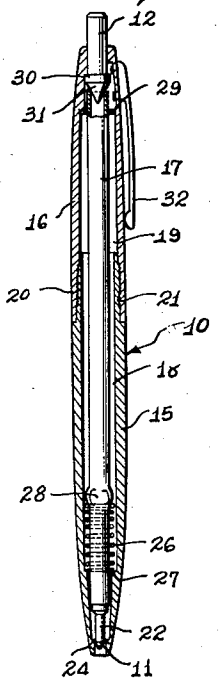


Fig. 3

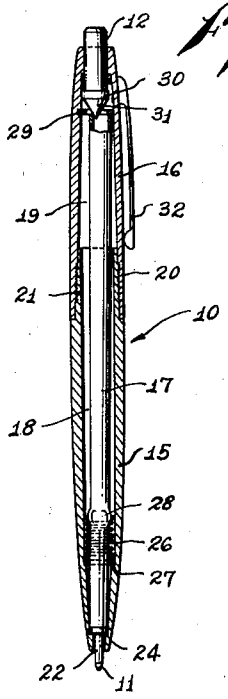
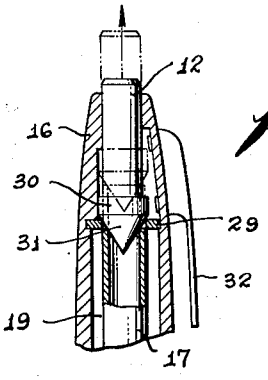


Fig. 4



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BALL POINT PEN

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Application September 22, 1952, Serial No. 310,827

3 Claims. (Cl. 120—42.03)

My invention relates generally to writing instruments of the ball point type, and more specifically to an improved operating mechanism for moving a writing cartridge or point assembly between an enclosed carrying position and an extended writing position.

In the conventional pen of this type a writing cartridge is slidably mounted within the pen barrel and is moved both on extension and retraction strokes by direct engagement with manually actuated push buttons, or the like. To hold the cartridge in an extended position, latching means are necessary, and these in turn must cooperate with latch releasing means to permit retraction. Because of size limitations, the working elements usually are of intricate design involving cams, plungers and other closely fitted interlocked parts. The result is that such operating mechanisms are sometimes subject to skipping, jamming, and rather frequent breakdowns. In addition, the manufacturing costs are relatively high due to the close tolerances of the parts and the assembly time required.

An embodiment of my invention utilizes a new mode of operation in which inertia-actuated means are provided for moving the writing cartridge to an extended writing position. In order to extend the point assembly, the pen is merely held firmly, and moved with a snap or wrist action similar to that used in shaking down the mercury column in a maximum reading thermometer. The sudden deceleration of the pen causes the writing cartridge to move outwardly and at the same time become positively engaged with latching means. Plunger actuated centering means of a simple form are used to release the writing cartridge to permit retraction to a carrying position. This mode of operation has been found to be quite convenient and practical in use. Furthermore, it permits the operating structure to be greatly simplified and composed of only a very few durable parts which are easily formed and assembled.

It is therefore a major object of my invention to provide a ball point pen having improved operating means for moving a point assembly between writing and carrying positions.

Another object of my invention is to provide inertia actuated operating means for moving a writing cartridge to an extended writing position.

It is also an object of my invention to provide operating means of the character described operable upon a snap movement of the hand.

A further object of the invention is to provide a writing cartridge supported in such a way as to be movable longitudinally for engagement with latching means upon inertia actuation of the operating means.

An additional object of my invention is to provide plunger operated releasing means for retracting the writing cartridge to a carrying position.

It is still another object of my invention to provide a form of latching means for resiliently supporting a writing cartridge so that the point assembly has a "cushioned feel" in writing.

A still further object of my invention is to provide means for holding the release plunger in inactive position during the inertia actuation of the operating means.

Yet another object of my invention is to provide operating means of simplified construction which may be easily formed and assembled and will give long and trouble-free service.

These and other objects and advantages of my invention will become apparent from the following detailed description of different forms thereof, and from an inspection of the accompanying drawings, in which:

Fig. 1 is a perspective view of the complete pen indicating the manner in which the operating means are actuated to position the point assembly in writing position;

Fig. 2 is a longitudinal medial section through one form of the pen showing the writing cartridge and point assembly in carrying position;

Fig. 3 is a view similar to Fig. 2 showing the writing cartridge in extended position; and

Fig. 4 is a sectional detail of the operating means seen in Figs. 2 and 3, with the release plunger moved forwardly to engage the writing cartridge.

Referring now to the drawings, and particularly to Fig. 1 thereof, the numeral **10** designates generally a pen housing or barrel formed as a tapered cylindrical member of conventional configuration. The front end of barrel **10** is open to permit extension and retraction of a ball point assembly **11**. Normally, point assembly **11** is retracted within barrel **10** to an enclosed carrying position as indicated in solid lines. When barrel **10** is given a sudden snap action by movement of the wrist, point assembly **11** is moved downwardly to an exposed writing position as shown in phantom outline. After the pen has been used, an operating plunger or button **12** at the rear end of barrel **10** is pushed to retract point assembly **11** back into the carrying position.

The internal construction of one very simple form of the pen is best seen in Figs. 2 and 3, wherein it is noted that barrel **10** is formed of two-part construction comprising a lower body **15** and upper cap **16** which are separable to permit replacement of an internal writing cartridge **17**. Body **15** is provided with an axially extending chamber **18**, while cap **16** has a similar enlarged chamber **19**. A reduced threaded hub **21** is formed on the upper end of body **15** for engagement within an internally threaded cap portion **20** to connect the cap and body firmly together.

Writing cartridge **17** is formed as an elongated tubular shell which extends through both chambers **18** and **19** and provides an ink reservoir in the lower intermediate section thereof. The upper portion of cartridge **17** is open to provide an annular rim adapted for engagement with operating plunger **12**, as will hereinafter be described. The previously-mentioned ball point assembly **11** is carried on a stem **22** formed on the lower end of cartridge **17** and has a freely rotatable ball for engagement with the writing paper. The front open end of body **15** slidably receives stem **22** in a relatively loose fit, and is formed with an internal shoulder **24** which abuts against the end of the tubular shell of cartridge **17** and limits its outward extension. In the carrying position as shown in Fig. 2, stem **22** is totally enclosed within body **15**, while the extended position shown in Fig. 3, the stem is projected forwardly to be exposed for writing. As the ball of nose assembly **11** rotates, it picks up a thin film of ink through stem **22** and moves it outwardly for transfer to the surface of the writing paper.

Surrounding the lower portion of cartridge **17** is a spring means in the form of a coil spring **26** which seats

downwardly against a shoulder 27 formed in the wall of chamber 18. The upper end of spring 26 engages a crimped projection 28 formed on cartridge 17 in such a position as to hold the cartridge upwardly in the carrying position when the spring is extended its full length. The strength of spring 26 is such as to just slightly overbalance the static weight of cartridge 17 and thus normally remain uncompressed when the pen is being carried. However, it can be understood that when a force in excess of gravity is applied against spring 26, the latter will yield downwardly.

The cooperative effect of spring 26 and cartridge 17 is to provide inertia-actuated operating means for moving point assembly 11 downwardly from the carrying position to the writing position. When the pen is held and moved with a snap action as previously described, the sudden deceleration necessitates the application of a force to stop the descent of cartridge 17. Since spring 26 is designed to just slightly overbalance the static weight of cartridge 17 the inertia of the cartridge carries it downwardly until it bottoms on shoulder 24, at which point the spring is compressed as seen in Fig. 3. This action is extremely easy to accomplish with a wrist movement and makes the pen instantly ready for use.

In order to hold cartridge 17 in the extended writing position, I provide in this form of the invention simplified latch means in the form of an internal annular projection 29 secured in the upper end of chamber 19. For ease of manufacture, projection 29 may be formed as an annular metallic ring secured in place within the wall of cap 16. The external diameter of cartridge 17 is such that it will slide freely within projection 29 when aligned with the axis of chamber 19. In the carrying position as shown in Fig. 2, the top cartridge 17 is extended a considerable distance above the projection 29. When cartridge 17 is moved downwardly to the writing position, the top of the cartridge is below projection 29 so that it is free to shift laterally into the larger chamber 19. As previously mentioned, cartridge 17 is freely rockable within chambers 18 and 19 so that the upper end portion tends to fall to one side or the other of the axis thereof. In this position, the rim of cartridge 17 bears upwardly against projection 29 and prevents upward movement of the former. Thus, it can be appreciated that the simple wrist movement described, accomplishes both the movement of cartridge 17 from the carrying to writing position, and the latching engagement with projection 29.

When the use of the pen has been completed, it is desired to release cartridge 17 from beneath projection 29 so that it can be retracted upwardly under the urging of spring 26. To this end, the operating plunger or push button 12 is slidably mounted in the top of cap 16 with an upper portion projecting for manual actuation. To support plunger 12 the top of cap 16 is closed inwardly to form a reduced bore which journals the plunger and constrains it for sliding movement along the axis of chamber 19. On the lower end or foot of plunger 12 is an enlarged head 30 which limits upward movement of the plunger by engaging the wall of cap 16, and downward movement by engagement with projection 29. Within these limits, plunger 12 is freely slidable. On the bottom of head 30 is a downwardly extending conical pin or stud 31 which is adapted to pass through projection 29 for engagement within the upper rim of cartridge 17 when plunger 12 is pressed downwardly.

As is seen in Fig. 3, projection 29 is of shallow depth to only slightly overhang the solid rim of cartridge 17, thus leaving substantially the entire center portion of the cartridge open. When centering pin 31 enters into the cartridge 17, the point slides downwardly adjacent the side of the cartridge rim opposite that latched beneath projection 29. The engagement of the conical pin surface following the point of pin 31 against the rim of cartridge 17 exerts a camming action tending to return the cartridge to alignment with the axis of chamber 19 and releasing it from beneath projection 29.

When hand pressure is released upon plunger 12, spring 26 urges both cartridge 17 and the plunger upwardly from the position shown in Fig. 4 to that shown in Fig. 2. At this time, centering pin 31 has aligned itself concentrically within cartridge 17 and tends to guide the latter upwardly through projection 29. To complete the structure of the pen I provide a spring pocket clip 32 secured to one side of cap 16 and formed with the conventional balled lower end.

While I have thus shown and described in detail an exemplary form of my invention, it can be understood that modifications of design and construction will be apparent to those skilled in the art. Therefore I do not wish to be restricted except as defined in the appended claims.

I claim:

1. A ball point writing instrument comprising: a barrel having an open front end and an inner axially extending chamber formed with an internal annular projection at the rear end thereof; a ball point assembly mounted in the front of said barrel for movement from an enclosed carrying position to an exposed writing position extended through said open end; operating means actuated by inertia for urging said point assembly to said writing position, said means including an ink cartridge connected to said point assembly for movement therewith between said carrying and writing positions and having a tubular rear end portion adapted to pass through said projection and rockable away from the axis of said chamber to engage thereunder upon movement to said writing position; spring means urging said cartridge toward said carrying position and yielding under a load greater than the static weight of said cartridge to permit said cartridge to move to said writing position; and an operating plunger slidably mounted in the rear end of said barrel and having an inner end shaped as a conical centering pin adapted to enter within the rear end of said cartridge and release said cartridge from beneath said projection and thereafter guiding said cartridge rearwardly through said projection for retraction to said carrying position.

2. A ball point writing instrument comprising: a barrel having an open front port and an enlarged inner longitudinally extending chamber; an internal annular shoulder at the rear end of said chamber; a ball point assembly including a writing tip adapted to extend through said front port and an ink cartridge, movable longitudinally and laterally in said chamber, the cartridge having an open end adapted to slidably pass through said annular shoulder; a spring normally urging said ball point assembly into retracted position, said spring being sufficiently strong to normally hold the cartridge with its open end through said annular shoulder and insufficiently strong to resist inertia of the ball point assembly, whereby the open end of the cartridge may move through the annular shoulder axially into the chamber and laterally under the annular shoulder when axial movement is imparted to the instrument and then rapidly decelerated, said annular shoulder engaging the end of the cartridge to hold the writing tip of the assembly in writing position; and selectively operable means for returning the assembly into retracted position, said means comprising an axially movable member arranged to directly engage the open end of the cartridge and shift the same into axial alignment with the annular shoulder for passage therethrough by said spring.

3. A ball point writing instrument comprising: a barrel having an open front end and an inner, longitudinally extending, substantially circular chamber; a cartridge provided with an inner rear end and a writing assembly at the other end, said cartridge being axially slidable in said chamber for movement of the writing assembly from an enclosed carrying position to a writing position, wherein the writing assembly extends through said open end of the

barrel, said chamber being larger than said cartridge, the rear end of the cartridge being laterally movable when the assembly is in exposed writing position; an internal, annular shoulder near the rear end of the chamber, said shoulder being adapted to engage the rear end of the cartridge when said rear end is laterally displaced to hold the cartridge in said writing position; said shoulder defining a bore adapted to slidably receive and axially position the rear portion of the cartridge when said cartridge and writing assembly are in enclosed, carrying position; spring means urging said cartridge toward said carrying position, said spring being only sufficient to support the static weight of the cartridge and urge the same into carrying position, and insufficient to prevent movement of the cartridge axially out of said bore into said chamber and laterally therein under said shoulder by rapid acceleration and deceleration of the entire pen in a forward direction, whereby inertia and momentum of the cartridge overcomes the biasing effect of said spring and the rear end

of said cartridge engages the shoulder and is held in writing position; and an operative plunger slidably mounted in the rear end of the barrel and protruding therefrom and having a foot adapted to directly engage and move the rear end of the cartridge laterally from the engagement with the shoulder into alignment with the bore for retraction of the cartridge by said spring to said carrying position.

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