United States Patent

Larson

[15] **3,679,317**

[45] **July 25, 1972**

[54] BALL-POINT PEN SAFETY LOCK

[72] Inventor: **Ivar G. Larson,** 7620 S.W. 58th Ave., South Miami, Fla. 33143

[22] Filed: **Sept. 14, 1970**

[21] Appl. No.: **71,725**

[52] **U.S. Cl.** **401/109**

[51] **Int. Cl.** **B43k 5/16**

[58] **Field of Search** ..... 401/99–117, 195; 200/169 BP, 44, 159

[56] **References Cited**

FOREIGN PATENTS OR APPLICATIONS

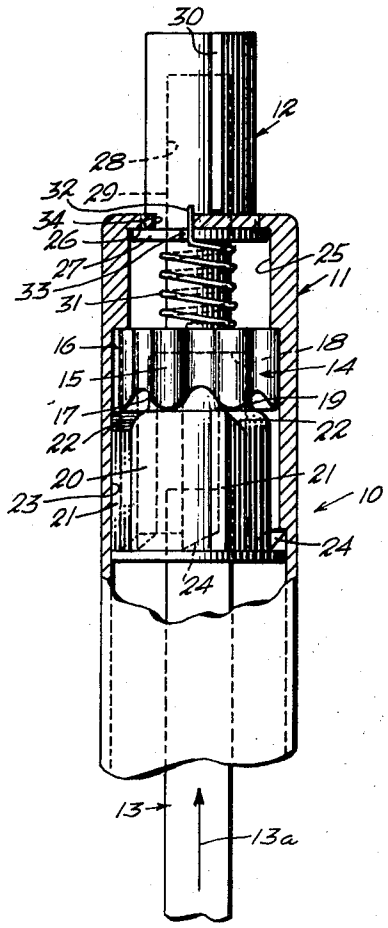
1,075,981 2/1960 Germany 401/109

Primary Examiner—Lawrence Charles
Attorney—Ernest H. Schmidt

[57] **ABSTRACT**

Mechanism for locking an ordinary retractable writing element ball-point pen to prevent inadvertent or accidental depression of the actuating plunger is described. The locking mechanism comprises an elongated abutment member extending longitudinally of the outside of the pen actuating plunger and normally overlying, at its lower end, a solid wall portion at the upper end of the pen housing, resilient means normally rotatively constraining the plunger so that the abutment members is in such overlying position, and a recess in the upper end of the pen casing, rotatively removed from the solid wall portion at the upper end of the pen, permitting manual depression of the actuating plunger only after the plunger is first turned from its normal or locking position to a position whereat the abutment member can pass through the recess.

7 Claims, 4 Drawing Figures



PATENTED JUL 25 1972

3,679,317

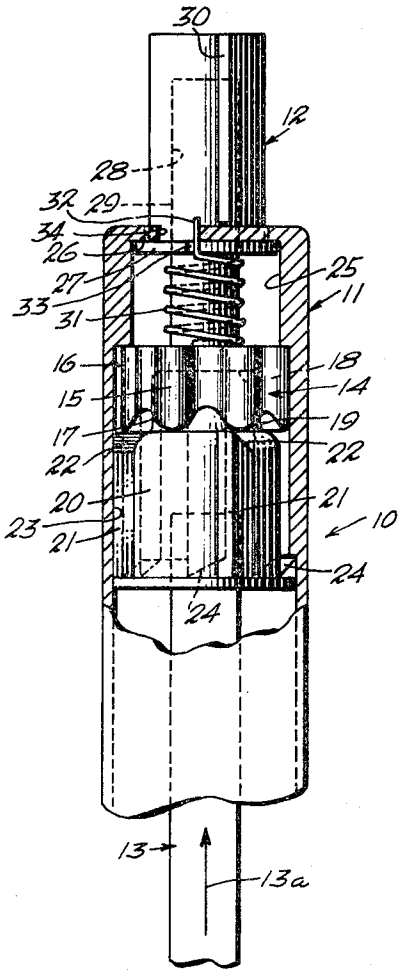


Fig. 1

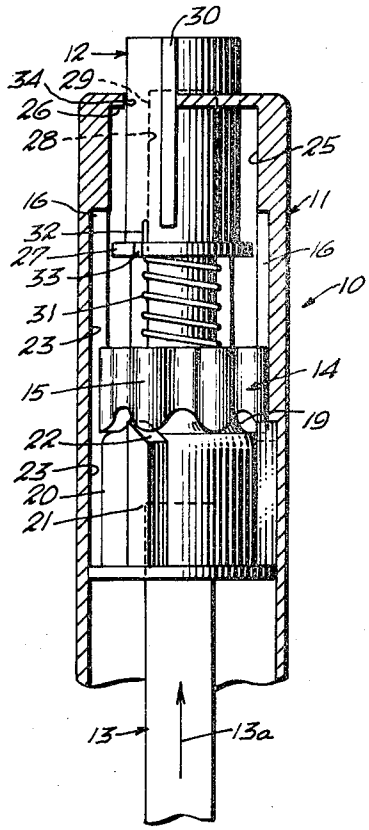


Fig. 2

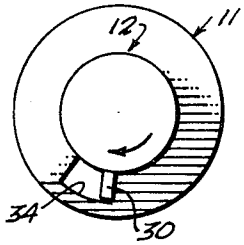


Fig. 3

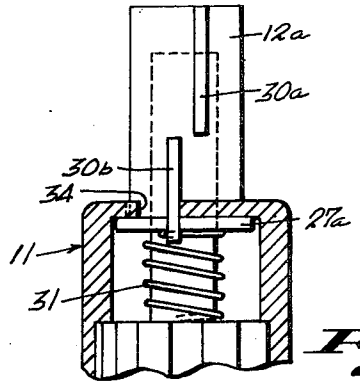


Fig. 4

INVENTOR.
IVAR G. LARSON

BY Ernest H. Schmidt

ATTORNEY.

BEST AVAILABLE COPY

BALL-POINT PEN SAFETY LOCK

This invention relates to ball-point pens and is directed particularly to a safety lock for retractable writing element ball-point pens to prevent accidental actuation of the control plunger at the upper end of the pen while wearing the pen in one's pocket, for example, thereby minimizing the possibility of ink leakage soiling the clothes.

Ordinary ball-point pens of the type having retractable writing elements or cartridges are provided with an actuating mechanism including a spring-pressed plunger at the upper end of the pen casing or housing which, when manually depressed, serves to project the ball-point writing element through a small opening at the opposite end of the housing for use of the pen in writing. The actuating mechanism comprises overide catch means which retains the writing element in such projecting or writing position. Release of the ball-point writing element to its withdrawn or non-writing position is effected simply by depressing the actuating plunger slightly beyond its override position, whereupon the plunger spring will be allowed to return the writing element and the associated plunger member to their respective withdrawn and outwardmost positions. With such ball-point pen actuating mechanism it not infrequently happens that the actuating plunger, while wearing such a pen in one's pocket or carrying it in one's purse, for example, is accidently or inadvertently depressed to such an extent that the pen is placed in writing condition, that is, with the ball-point writing element projecting from the lower end of the pen. When this happens, contact of the ball-point ink tip with the clothing on which the pen is being carried, or with absorbent articles in a purse within which such an actuated pen is being carried, not infrequently results in ink staining. When in contact with highly absorbent fabrics such as cotton, such ink stains or blots can become large, unsightly and difficult to remove because of capillary attraction.

It is, accordingly, the principal object of this invention to provide a safety lock mechanism for retractable writing element ball-point pens to obviate the above-described deficiency and thereby minimize the possibility of accidently ink staining one's clothing or articles carried along with a ball-point pen in one's purse.

A more particular object of the invention is to provide a safety lock mechanism for ball-point pens of the character described wherein the actuating plunger can be depressed for placing a pen in writing condition only after first having turned the plunger through a predetermined arc against the torsional force of a return spring.

Another object of the invention is to provide a locking mechanism of the above nature which can readily be adapted to use in combination with ordinary retractable ball-point pen mechanisms with only minor modification thereof.

Yet another object of the invention is to provide a locking mechanism of the above nature which will be dependable in performance, long wearing in use, attractive in appearance, and at the same time extremely simple and inexpensive to manufacture.

Other objects, features and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

FIG. 1 is a fragmentary upper end view, in elevation, of a ball-point pen equipped with a safety lock embodying the invention, a portion of the pen casing being broken away to illustrate mechanical details;

FIG. 2 is an elevational view similar to that of FIG. 1 but showing the mechanism and its associated ink cartridge element in depressed condition for writing;

FIG. 3 is a top view of the depressed pen illustrated in FIG. 2; and

FIG. 4 is a partial view similar to that of FIG. 1, but illustrating a modified form of the invention.

Referring first to FIGS. 1 and 2 of the drawings, 10 designates, generally, the upper end portion of a typical ball-point pen embodying the invention. Ball-point pen 10 comprises a cap or upper pen case member 11 through an opening in the upper end of which an actuating plunger 12 extends for controlling the extension of the usual tubular ball-point cartridge or writing element 13 (partly illustrated), which writing element either projects for writing or is withdrawn when not in use with respect to a lower pen case member (not illustrated) removably attachable to the upper pen case member 11 for assembly and replacement of said ball-point tubular writing element whenever necessary.

In ordinary ball-point pens, of which this invention is an improvement as is hereinafter particularly described, the means by which the actuating plunger at the upper end of the pen selectively controls the movement between a position whereat the tubular writing element either projects from the lower end of the pen for writing, or is withdrawn into the casing when not in use, comprises on override cam mechanism operated against a compression spring located at the lower end of the pen and operative to resiliently urge the tubular writing element 13 in the upward or withdrawn position, as designated by the arrow 13*a* in FIGS. 1 and 2. While such selective positioning cam mechanism is not claimed as new herein, it will now be described briefly because of its cooperative association with the ball-point pen safety lock embodying my invention, and for a better understanding of my invention as it applies to typical plunger-actuated ball-point pens of modern construction. Thus, as illustrated in FIGS. 1 and 2, the plunger-actuated ball-point writing element positional control mechanism comprises a cam operator member 14 having equidistantly spaced, longitudinally extending peripheral ribs 15 received for longitudinal sliding movement in longitudinal slots 16 formed within the interior of the upper pen case member 11. It will be evident that the cam operator member 14 is constrained to longitudinal movement within the upper pen case member 11 and cannot be rotated with respect thereto. The lower ends of the longitudinally extending ribs 15 are arcuately curved to provide a peripherally spaced plurality of concavely rounded cam surface portions 17. The cam operator member 14 is further provided, in its underside, with a cylindrical recess 18 received within which is the reduced diameter end portion 19 of a tubular cam follower member 20. The lower end of the tubular cam follower 20 is integrally formed with three equidistantly peripherally spaced, radially outwardly extending rib portions 21 the upper ends of which are all beveled or inclined in the same direction to provide cam follower surface portions 22 cooperatively associated with the arcuate cam surfaces 17 of the cam operator 14. In addition to the longitudinally extending slots 16 within the upper pen case member 11, said pen case member is also formed with somewhat deeper slots 23 for guidingly receiving the outwardly extending rib portions 21 of the tubular cam follower member 20. The lower ends of the slots 23 define therebetween inclined shoulders 24 adapted to hookingly engage the cam surface portions 22 of the tubular cam follower member 19 when said tubular cam follower member is depressed sufficiently to carry said cam follower member under said shoulders. This position is illustrated in FIG. 2, wherein the ball pen writing element 13, the upper end of which is received within the tubular cam follower member 19, is thus selectively positioned in its projecting or writing position. Upon the next depression of the actuating plunger 12, the arcuate cam surfaces 17 of the cam operator member 14 sliding upon the inclined cam follower surface portions 22 of the cam follower member 19 rotate said cam follower member sufficiently to disengage it from its interhooking position with respect to the inclined shoulders 24 to permit its retraction under the urging of the tubular writing element compression spring (not illustrated) and effecting the withdrawal of said ball-point writing element 13 into the pen housing, as illustrated in FIG. 1.

The ball-point pen safety lock mechanism comprising the present invention will now be described. Referring to FIGS. 1, 2 and 3 the upper end of the upper pen case member or cap 11 is provided with a central, substantially circular opening 25 of

decreased diameter with respect to the interior of said upper pen case member to define an interior annular shoulder **26**. The substantially cylindrical actuating plunger **12** is integrally formed at its lower end with an outwardly extending peripheral flange **27** which serves as an abutment seating against the interior annular shoulder **26** when said actuating plunger is in its outwardmost or non-use pen position, as illustrated in FIG. **1**. The actuating plunger **12** is also formed, in its underside, with a central, cylindrical recess **28** within which is rotatably received an upstanding cylindrical central post portion **29** integrally formed with the cam operator member **14**. It will be understood that, as described above, the usual compression spring (not illustrated) operative to urge the tubular ball-point writing element **13** in the upward or withdrawn position as illustrated in FIG. **1**, operates through the tubular cam follower member **19** and the cam operator member **14** (with its associated outstanding cylindrical central post portion **29**) to yieldingly urge the actuating plunger **12** in its upwardmost, outwardly extending position of non-use.

A salient feature of the invention is the provision of means preventing accidental actuation of the plunger into use position while wearing the ball-point pen in a pocket, for example, to minimize the possibility of ink leakage soiling one's clothing. To this end, the present invention comprehends the provision of safety lock mechanism preventing actuation of the pen into writing position by the simple act of pressing straight down upon the actuating plunger **12**, as in ordinary ball-point pen construction, and requiring instead that the actuating plunger first be turned to an unlocking position before it can be depressed sufficiently to project the tubular ball-point writing element **13** outwardly at the lower end of the pen and into writing position. Thus, as illustrated in FIGS. **1** and **2**, the outer wall of the actuating plunger **12** is integrally formed with a longitudinally extending rib **30** which terminates just short of the upper end surface of the upper pen case member **11** when the said actuating plunger is in outwardly extending release or non-use position. A helical torsion spring **31** circumjacent the lower end portion of the upstanding central post **29** of the cam operator member **14** has its lower end fixed with respect to said central post and its upper end **32** extending through a narrow recess **33** in the peripheral flange **27** of the actuating plunger **12**. The vertically extending upper end portion **32** of the helical torsion spring **31** projects upwardly through and somewhat beyond an arcuately extending recess **34** opening into the central opening **25** in the upper end of the upper pen case member **12**. The helical torsion **31** is so stressed as to rotatively urge the actuating plunger **12** in the anticlockwise direction (as viewed in FIG. **3**) so that the lower end of the plunger rib **30** will normally be disposed in overlying relation with respect to an upper end portion of the upper pen case member **11**, (see FIG. **1**). Thus, the pen cannot be put into use position, whether purposely or accidently, simply by the application of downward pressure upon the actuating plunger **12**.

In order to release the pen safety lock mechanism it is necessary first to turn the actuating plunger **12** clockwisely through a small angle against the reactive torsional force of the helical torsion spring **31** to a position whereat the actuating plunger rib **30** can pass through the arcuately extending recess **34**, whereupon full depression of said plunger can be effected, as illustrated in FIG. **2**, to place the pen in writing position by operation of the usual cam override mechanism hereinabove described.

Release of the tubular ball-point writing element or cartride **13** into retracted or non-use position can thereafter be effected in the usual manner simply by pressing down upon the actuating plunger **12** from the position illustrated in FIG. **2** to disengage the tubular cam follower member **19** as hereinabove described, whereupon the entire mechanism will return to the position illustrated in FIG. **1**. In the return of the operating mechanism, it will be understood that once the lower end of the rib **30** of the actuating plunger **12** has passed beyond the upper surface of the upper end of the pen case member **11**, the torsional stress of the helical torsion spring **30** acting between the cam operator member **14** and the actuating plunger **12** serves to automatically turn said actuating plunger into its safety locked position again as illustrated in FIG. **1** and as described above.

FIG. **4** illustrates a modification of the invention wherein, instead of the upper end of the torsion spring **31** extending upwardly through the arcuate slot **34**, the actuating plunger **12*a*** is formed with a second longitudinal rib **30*b*** which projects slightly outwardly beyond the lower surface of the plunger flange **27*a*** for interhookingly receiving the upper end of said torsion spring. The second longitudinal rib **30*b*** extends partially upwardly along the actuating plunger **12** to terminate substantially in register with the lower end of a peripherally offset longitudinal abutment rib member **30*a***. With reference to FIG. **4** it will be seen that the actuating plunger **12*a*** can be depressed for a substantial distance before the lower end of the rib **30*a*** abuts an upper end portion of the upper pen case member **11**. This depression distance is not sufficient, however, to operate the cam mechanism controlling the tubular ball-point writing element or cartridge **13** for setting the pen into writing position. Operation of the pen safety lock mechanism is otherwise the same as that of the invention illustrated in FIGS. **1** through **3**. In each embodiment of the invention it will be noted that means is provided for limiting the manually actuated rotary movement of the actuating plunger **12** or **12*a*** upon manipulating the actuating plunger into fully depressed writing position of the pen. In the first embodiment, such limiting is effected by the upwardly extending upper end portion **32** of the helical torsion spring **31** coming into abutment with a leading edge of the arcuately extending recess **34**, and in the embodiment illustrated in FIG. **4**, by the second longitudinal rib **30*b*** coming into abutment with said leading edge.

While I have illustrated and described herein only two forms in which my invention can conveniently be embodied in practice, it is to be understood that these embodiments are given by way of example only and not in a limiting sense. For example, it is contemplated that, if desired, the locking mechanism comprising the plunger rib **30** of the embodiment illustrated in FIGS. **1** and **2**, or the ribs **30*a*** and **30*b*** of the embodiment illustrated in FIG. **4**, could be hidden within a slightly extended upper end cavity of the pen housing, with the provision of a uniformly cylindrical projecting plunger end portion, to stimulate in appearance ordinary non-locking retractable ball-point pens. The invention, in brief, comprises all the embodiments and modifications coming within the scope and spirit of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. A safety lock mechanism for retractable ball-point pens of the type having a ball-point writing element selectively movable between a first position whereat the writing element is withdrawn within one end of the pen housing and a second position whereat the writing element is in the projecting position with respect to said one end of the pen housing, and wherein the actuating mechanism for said selective movement comprises an actuating plunger member projecting through an opening in the other end of the pen housing and movable, selectively, between a first outwardly projecting position and a second outwardly projecting position relatively inward of said first outwardly projecting position, with respect to said opening at the other end of the pen housing, comprising, in combination, means permitting limited rotative movement between first and second rotative positions of said actuating plunger member with respect to the pen housing, means yieldingly constraining said actuating plunger member in the first of said rotative positions, abutment means on said actuating plunger member cooperative with said pen housing and operative to prevent selective movement of said plunger from said first to said second outwardly projecting position, and means permitting movement of said actuating plunger between said first and second projecting positions when said

BEST AVAILABLE COPY

actuating plunger is in said second rotative position, said means permitting limited rotative movement of said actuating plunger member comprising an arcuate recess provided in a marginal peripheral zone of the pen housing opening through which said actuating plunger member projects.

2. A safety lock mechanism for retractable ball-point pens as defined in claim 1, wherein said means yieldingly constraining said actuating plunger member in said first of said rotative positions comprises a torsion spring coaxially arranged with respect to said actuating plunger member, and wherein said means permitting limited rotative movement of said actuating plunger member further comprises an upwardly directed end portion of said helical spring extending from within said pen housing upwardly through said arcuate recess, and means coacting between said actuating plunger member and said upwardly directed end of said helical torsion spring for constraining their rotative movement in unison.

3. A safety lock mechanism for retractable ball-point pens as defined in claim 1, wherein said abutment means comprises an elongated, longitudinally extending rib element the lower end of which, when said actuating plunger member is in said first rotative position, overlies a peripheral marginal zone of the pen housing opening which is arcuately removed from said arcuate recess.

4. A safety lock mechanism for retractable ball-point pens as defined in claim 2, wherein said abutment means comprises an elongated, longitudinally extending rib element the lower end of which, when said actuating plunger member is in said first rotative position, overlies a peripheral marginal zone of the pen housing opening which is arcuately removed from said arcuate recess in the direction of torsional stress of said torsion spring.

5. A safety lock mechanism for retractable ball-point pens as defined in claim 1, wherein said abutment means comprises a first elongated longitudinally extending rib element the lower end of which, when said actuating plunger member is in said first rotative position, overlies a peripheral marginal zone of the pen housing opening which is arcuately removed from said arcuate recess, and wherein said means permitting limited rotative movement of said actuating plunger member further comprises a second elongated, longitudinally extending rib element on said actuating plunger member arcuately spaced with respect to said first rib element, said second rib element being so disposed as to extend through said arcuate recess when said actuating plunger member is in said first outwardly projecting position.

6. A safety lock mechanism for retractable ball-point pens as defined in claim 5, wherein said means yieldingly constraining said actuating plunger member in said first of said rotative positions comprises a torsion spring coaxially arranged with respect to said actuating plunger member, one end of said torsion spring being interfixed with respect to the lower end of said second rib element for resiliently constraining one side of said second rib element in sliding engagement with an edge portion of said arcuate recess.

7. A safety lock mechanism for retractable ball-point pens as defined in claim 6, wherein said first and second rib elements are integrally formed with said actuating plunger member and wherein the lower end of said first rib element is substantially co-extensive with the upper end of said second rib element.

* * * * *