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PATENT SPECIFICATION



Application Date: Jan. 10, 1939. No. 823/39.

523,717

Complete Specification Left: Jan. 10, 1940.

Complete Specification Accepted: July 22, 1940.

PROVISIONAL SPECIFICATION

Improvements in or relating to Fountain Pens

We, CONWAY, STEWART AND COMPANY LIMITED, a British Company, of 75 to 82, Shoe Lane, London, E.C.4, and ARTHUR STANLEY JONES, a British Subject, of 42, Cedar Gardens, Upminster, in the county of Essex, do hereby declare the nature of this invention to be as follows:—

This invention relates to fountain pens and refers more particularly to fountain pens provided with the plunger type of self filling mechanism.

The object of the invention is the provision of improvements in the self filling mechanism by which, amongst other advantages, leakage will be prevented and said mechanism will be rendered more sure in its operation.

In accordance with the invention means are provided, in addition to the propelling mechanism for the plunger, for screwing the plunger to its final retracted position, at which position the rear surface of the plunger may engage with a seating for preventing leakage.

In accordance with a further feature of the invention means are provided for positively preventing rotation of the plunger in the barrel so that the propulsion thereof, which is effected through a screw thread transmission, is rendered positive.

In accordance with one embodiment of the invention, the plunger is moved forwards and backwards in the barrel, through a screw transmission, in response to the rotation of a driving element at the back end of the barrel, which driving element is rotatable but not longitudinally movable with respect to the barrel.

The screw transmission consists essentially of three parts, viz.: said driving element which comprises a longitudinally disposed driving tube, a plunger tube which is secured to, and extends rearwardly from, the plunger, and an archimedian screwed rod which mates within the rear end of the plunger tube and within the forward end of the driving tube. Means are provided to prevent the plunger from rotating in the barrel, and thus, when the driving tube is rotated the plunger is moved longitudinally by virtue of the relative rotation both between the driving

tube and the screwed rod, and between the screwed rod and the plunger tube. The parts are formed so that the screwed rod cannot be withdrawn completely either from the plunger tube or the driving tube and thus the outer limit of the plunger movement is determined. The inner limit of the plunger movement is determined as will be hereinafter described. The rear end of the screwed rod is of course prevented from moving beyond the rear end of the driving tube which is closed.

For preventing the plunger rotating within the barrel, the outside of the plunger tube is made of square section and said plunger tube engages slidably within a square section locating tube which in turn engages slidably within the squared front portion of the bore of a fixed tubular part screwed into the back of the barrel and projecting forwardly therein. The parts are formed so that the locating tube cannot be withdrawn completely either from the plunger tube or from the fixed tubular part, and, as the plunger moves to and fro in the barrel, the plunger tube telescopes in the locating tube, and the latter telescopes in the fixed tubular part, the plunger being prevented from rotating.

The connection of the driving tube to the rear end of the barrel is through the medium of another rotatable tube hereinafter termed the locking tube. This locking tube is mounted so as to be rotatable, but not longitudinally movable, within the rear end of the aforesaid fixed tubular part, and the driving tube is mounted so as to be rotatable, but not longitudinally movable, within the locking tube. The locking tube extends forwardly beyond the forward end of the driving tube and its forward end has an internal screw thread which is adapted to mate with an external screw thread on the rear end of the plunger tube. In operation therefore when the plunger has been retracted by rotation of the driving tube until the rear end of the plunger tube meets the forward end of the locking tube, the driving tube can be turned no further. The locking tube is then turned

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so as to screw the end of the plunger tube into said locking tube thereby retracting the plunger a little further. This final retraction brings the rear face of the plunger into abutment with the forward end of the aforesaid fixed tubular part within the barrel, thereby positively preventing the possibility of leaking. At the same time the screwed engagement of the plunger tube within the locking tube renders the driving tube incapable of operating the plunger. Therefore when the plunger is to be again moved forwardly the locking tube must be first operated to liberate it.

The mounting of the locking tube within the rear end of the fixed tubular part is through the medium of a connecting bush which is screwed into the rear end of the fixed tubular part and within which the locking tube rotates. Suitable shoulders formed respectively on the inner periphery of the connecting bush and the outer periphery of the locking tube prevent rearward movement of said locking tube. Forward movement of the latter is prevented by a hand knob or button mounted thereon just behind said connecting bush.

In like manner rearward movement of the driving tube is prevented by suitable shoulders on the inner periphery of the locking tube and the outer periphery of the driving tube respectively, and forward movement of said driving tube is prevented by a knob or button mounted

thereon just behind the locking tube and locking tube button.

In practice it is usually more convenient to perform the complete operation by means of the locking button. To make this possible, a friction washer is provided between the locking button and the driving button. When therefore the locking button is rotated, if the plunger tube is in engagement with the locking tube, the locking tube only will be rotated, to screw the plunger tube up or unscrew it as the case may be, the friction washer slipping. When the plunger tube is not in engagement with the locking tube, the locking tube will simply drive the driving tube through the medium of the friction washer for propelling the plunger up and down the barrel.

It will be appreciated that the pitch of the thread of the archimedian screwed rod is relatively great for propelling the plunger quickly. The pitch of the locking thread is relatively very small.

It will be appreciated that the rear portion of the fixed tubular part, the rear portion of the connecting bush, the locking button and the driving button all form one continuous smooth surface with the barrel.

Dated this 10th day of January, 1939.

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For the Applicants.

COMPLETE SPECIFICATION

Improvements in or relating to Fountain Pens

We, CONWAY, STEWART AND COMPANY LIMITED, a British Company, of 75 to 82, Shoe Lane, London, E.C.4, and ARTHUR STANLEY JONES, a British Subject, of 42, Cedar Gardens, Upminster, in the county of Essex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to fountain pens and refers more particularly to fountain pens provided with the plunger type of self filling mechanism.

The object of the invention is the provision of improvements in the self filling mechanism by which, amongst other advantages, leakage will be prevented and said mechanism will be rendered more sure in its operation.

The invention comprises a fountain pen provided with self filling mechanism of the plunger type, and in which a part

which moves longitudinally with the plunger is prevented from rotating in the barrel, wherein means are provided, in addition to the propelling mechanism for the plunger, for screwing said part and therefore the plunger to its final retracted position.

The invention further comprises a fountain pen provided with self filling mechanism of the plunger type, wherein when said plunger is retracted by the propelling mechanism, a screw thread which moves longitudinally with said plunger engages a screw thread on a rotatable locking element so that subsequent rotation of said locking element effects screwing of said plunger to said final retracted position.

In order that the invention may be the more clearly understood, a fountain pen in accordance therewith will now be described, reference being made to the accompanying drawing.

Referring to the drawing, the plunger 1 is moved forwards and backwards in the barrel 2, through a screw transmission, in response to the rotation of a driving 5 element at the back end of the barrel, which driving element is rotatable but not longitudinally movable with respect to the barrel.

The screw transmission consists 10 essentially of three parts, viz.: said driving element which comprises a longitudinally disposed driving tube 3, a plunger tube 4 which is secured to, and extends rearwardly from, the plunger 1, 15 and an archimedian screwed rod 5 which mates within the rear end of the plunger tube 4 and within the forward end of the driving tube 3. Means are provided (to be hereinafter described) to prevent the 20 plunger 1 from rotating in the barrel 2, and thus, when the driving tube 3 is rotated the plunger 1 is moved longitudinally by virtue of the relative rotation both 25 between said driving tube and the screwed rod 5, and between the screwed rod and the plunger tube 4. The parts are formed so that the screwed rod 5 cannot be withdrawn completely either from the plunger tube 4 or the driving tube 3 and thus the 30 outer limit of the plunger movement is determined. The inner limit of the plunger movement is determined as will be hereinafter described. The rear end of the screwed rod 5 is of course prevented 35 from moving beyond the rear end of the driving tube 3 which is closed.

For preventing the plunger 1 rotating within the barrel, the outside of the plunger tube 4 is made of square section 40 and said plunger tube engages slidably within a square section locating tube 6 which in turn engages slidably within the squared front portion of the bore of a fixed tubular part 7 screwed into the back of the 45 barrel and projecting forwardly therein. The parts are formed so that the locating tube 6 cannot be withdrawn completely either from the plunger tube 4 or from the fixed tubular part 7, and, as the plunger 50 1 moves to and fro in the barrel, the plunger tube 4 telescopes in the locating tube 6, and the latter telescopes in the fixed tubular part 7, the plunger being prevented from rotating.

The connection of the driving tube 3 to the rear end of the barrel is through the medium of another rotatable tube 8 hereinafter termed the locking tube. This 55 locking tube 3 is mounted so as to be rotatable, but not longitudinally movable, within the rear end of the aforesaid fixed tubular part 7, and the driving tube 3 is mounted so as to be rotatable, but not 60 longitudinally movable, within the locking tube 8. The locking tube 8 extends

forwardly beyond the forward end of the driving tube 3 and its forward end has an internal screw thread 9 which is adapted to mate with an external screw thread 10 on the rear end of the plunger tube 4. 70 The rotation of the driving tube 3 is effected by the rotation of the locking tube 8, through the medium of a friction washer 13 between them, the locking tube being rotated by means of a hand button 12 rigidly mounted on it. In operation, 75 when the plunger 1 has been retracted, by rotation of the parts 12, 8 and 3 as one unit, until the rear end of the plunger tube 4 meets the forward end of the locking tube 8, the rotation of the driving tube is checked. Continued rotation of the 80 hand button 12 will however continue the rotation of the locking tube 8, the friction washer 13 slipping. This will screw the end of the plunger tube 4 into said locking tube 8 thereby retracting the plunger 1 a little further. This final retraction brings the rear face of the plunger 1 into abutment with the forward end of the afore- 90 said fixed tubular part 7 within the barrel, thereby positively preventing the possibility of leaking. When the plunger is again moved forwardly, the button 12 is simply rotated in the reverse direction, 95 its first movement rotating the locking tube 8 in advance of the driving tube 3, by slipping the friction washer 13 until the screw threads 10 and 9 disengage, and its subsequent movement rotating the 100 driving tube through the medium of said friction washer and advancing the plunger.

The mounting of the locking tube 8 within the rear end of the fixed tubular 105 part 7 is through the medium of a connecting bush 11 which is screwed into the rear end of the fixed tubular part and within which the locking tube rotates. Suitable shoulders formed as shown 110 respectively on the inner periphery of the connecting bush 11 and the outer periphery of the locking tube 8 prevent rearward movement of said locking tube. Forward movement of the latter is pre- 115 vented by the hand button 12.

The mounting of the driving tube 3 within the locking tube 8 is effected, as clearly shown in the drawing, by means of a helical spring 14 acting on a shoulder 120 on the outside of said driving tube to press the latter forwardly with respect to the locking tube, so that the friction washer 13 is pressed by the forward end of said driving tube against a shoulder on the 125 inner periphery of said locking tube.

It will be appreciated that the pitch of the thread of the archimedian screwed rod 5 is relatively great for propelling the plunger 1 quickly. The pitch of the lock- 130

ing thread 9 and 10 is relatively very small.

It will be appreciated that the rear portion of the fixed tubular part 7, the rear 5 portion of the connecting bush 11 and the button 12 all form one continuous smooth surface with the barrel 2.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A fountain pen provided with self filling mechanism of the plunger type, 15 and in which a part which moves longitudinally with the plunger is prevented from rotating in the barrel, wherein means are provided, in addition to the propelling mechanism for the plunger, for 20 screwing said part and therefore the plunger to its final retracted position.

2. A fountain pen according to claim 1, wherein, when said plunger is retracted by the propelling mechanism, a screw thread 25 on said part engages a screw thread on a rotatable locking element so that subsequent rotation of said locking element effects screwing of said part and therefore said plunger to said final retracted 30 position.

3. A fountain pen provided with self filling mechanism of the plunger type, wherein when said plunger is retracted by the propelling mechanism, a screw thread 35 which moves longitudinally with said plunger engages a screw thread on a rotatable locking element so that subsequent rotation of said locking element effects screwing of said plunger to said 40 final retracted position.

4. A fountain pen according to any of the preceding claims, wherein, at said final retracted position of the plunger, a surface which moves longitudinally with 45 said plunger engages a seating for preventing leakage.

5. A fountain pen according to any of the preceding claims, wherein the propulsion of said plunger is effected through a screw threaded transmission, in response 50 to the rotation of a driving element.

6. A fountain pen according to claim 5

and claim 2 or 3, wherein said driving element and said locking element are connected through the medium of a friction 55 or slipping connection, so that rotation of said locking element, if the plunger is free, effects rotation of said driving element and normal propulsion of said plunger, and, if said two screw threads 60 are in engagement, effects the screwing up, or the unscrewing of said two screw threads the friction or slipping connection slipping.

7. A fountain pen according to claim 5 65 or 6, wherein said screw threaded transmission comprises a plunger tube extending rearwardly from said plunger, said driving element, and an archimedian 70 screwed rod in screwed engagement both with said plunger tube and said driving element.

8. A fountain pen according to claim 1 or any of the claims appendant thereto, wherein the prevention of rotation of said 75 plunger in the barrel is effected by the telescopic non-rotatable engagement of a member extending rearwardly from said plunger with a non-rotatable element.

9. A fountain pen according to claim 8, wherein said non-rotatable element is non-rotatable by virtue of its making telescopic non-rotatable engagement with a 80 second element fixed in the barrel.

10. A fountain pen according to claim 85 9 and claim 4, wherein a surface of said second element fixed in the barrel constitutes the seating with which the surface which moves longitudinally with said 90 plunger engages.

11. A fountain pen according to any of claims 8 to 10 and claim 2 or 3, wherein said member extending rearwardly from said plunger constitutes the part referred 95 to in claim 2 or 3.

12. A fountain pen substantially as herein described with reference to the accompanying drawing.

Dated his 10th day of January, 1940.

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For the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

