

PATENT SPECIFICATION

598,726



Application Date: Sept. 7, 1945. No. 23082/45.

" " Nov. 9, 1945. No. 29938/45.

One Complete Specification left (under Section 16 of the Patents and Designs Acts, 1907 to 1946): Sept. 9, 1946.

Specification Accepted: Feb. 25, 1948.

PROVISIONAL SPECIFICATION

No. 23082 A.D. 1945.

Improvements in and relating to Self-filling Fountain Pens

I, ERIC ERNEST SAMUEL WADE, a British Subject, of The Lang Pen Company Limited, 13, Hope Street, Liverpool, 1, in the County of Lancaster, do hereby declare the nature of this invention to be as follows:—

This invention relates to self-filling fountain pens with more especial reference to so called vacuum self-filling pens in which the filling operation is effected by repeated manipulation of a small plunger in the rear end of the pen barrel.

Heretofore in such pens which have an air tube associated with the nib feed, the plunger has either been provided with a rearwardly directed shank extending from the body or barrel and requiring a removable cover or else it is pushed forwardly at the conclusion of the filling operation with resultant reduction in the effective capacity of the pen.

The present invention has for its object to provide an improved construction of a plunger actuating mechanism in which although the plunger is drawn rearwardly to conclude the filling operation and the maximum effective capacity of the barrel is utilised, there is no projecting shank requiring a removable cover.

According to the present invention, the plunger, and its actuating member carrying a finger piece for manipulation are separate components and are arranged to telescope into each other at the conclusion of a filling operation. Conveniently they are connected by a coarse pitch screw thread so that rotation of the finger piece in one direction withdraws the member ready for actuation of the plunger during the filling operation while rotation in the other direction telescopes the two components together.

Advantageously the plunger mechanism is carried in a cylindrical plug or ferrule adapted to be screwed into the rear end of the barrel, and having a seat for the rear face of the plunger when the components are telescoped so that not only is the full ink capacity of the barrel utilised but the plunger, being drawn against its seat, constitutes an effective seal preventing

leakage of ink at the rear end of the barrel or reservoir.

In a specific embodiment of the improved plunger mechanism where all the parts are of vulcanite, a solid cylindrical plunger fitting the bore of the barrel has a central rearwardly projecting screwed boss taking into a hollow shank which is of square section and rides in a similarly shaped aperture in a plug adapted to be screwed into the rear end of the barrel.

Threads of a coarse pitch are formed on the external surface of the square hollow shank which at its rear end passes into a sleeve tapped to receive it and forming the plunger actuating member. The sleeve rides in the cylindrical plug and at its rearward extremity is closed by a small cap forming a finger piece. The parts are assembled by screwing the hollow shank through the sleeve member from the rear, fitting the cap or finger piece and then sliding the shank through the square aperture in the plug before attaching the plunger to its front end and screwing the plug into the barrel. By rotating the finger piece the hollow shank is moved longitudinally in relation to the sleeve member and the plunger can be brought up against a seat formed for the purpose at the inner or front end of the plug.

To fill the pen, the finger piece is first rotated to unscrew its sleeve along the shank to a limit stop and thereafter the plunger is reciprocated to draw ink into the barrel. When the latter is fully charged and the plunger is in its rearmost position, the finger piece is turned in the opposite direction to telescope its sleeve over the square shank of the plunger and draws the latter against its seat when the pen is ready for use.

As will be understood, the mechanism when telescoped is accommodated within the length of the mounting plug with only the plunger head projecting at one end and the finger piece at the other, and is a neat and compact unit sub-assembly.

By the present invention improved filling mechanism for fountain pens is obtained which may be readily and cheaply

[Price 1/-]

Price 4s 6d

manufactured and which is convenient, efficient and durable in use.

Dated this 7th day of September, 1945.
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PROVISIONAL SPECIFICATION

No. 29938 A.D. 1945.

Improvements in and relating to Self-filling Fountain Pens

I, ERIC ERNEST SAMUEL WADE, a British Subject, of The Lang Pen Company Limited, 13, Hope Street, Liverpool, 1, in the County of Lancaster, do hereby declare the nature of this invention to be as follows:—

This invention relates to self-filling fountain pens with more especial reference to so called vacuum self-filling pens in which the filling operation is effected by repeated manipulation of a small plunger in the rear end of the pen barrel.

Heretofore in such pens which have an air tube associated with the nib feed, the plunger has either been provided with a rearwardly directed shank extending from the body or barrel and requiring a removable cover or else it is pushed forwardly at the conclusion of the filling operation with resultant reduction in the effective capacity of the pen.

In co-pending Application No. 23082/45 an improved arrangement is described in which the plunger and its actuating member carrying a fingerpiece for manipulation are separate components and are arranged to telescope into each other at the conclusion of a filling operation so that although the plunger is drawn rearwardly to conclude the filling operation and the maximum effective capacity of the barrel is utilised, there is no projecting shank requiring a removable cover.

The plunger and fingerpiece are connected by a coarse pitch screw thread and to fill the pen the fingerpiece is first rotated to unscrew it along the shank of the plunger to a limit stop and thereafter the plunger is reciprocated to draw the ink into the barrel, this being a two-handed operation.

In accordance with the present invention spring means are interposed between the fingerpiece or actuating member and the barrel mounting of the mechanism so that during the filling operation the plunger is automatically returned to its rearward position after depression of the fingerpiece whereby the pen can be filled by manipulation with one hand only.

Advantageously as in the aforementioned application, the plunger mech-

anism is carried in a cylindrical plug or ferrule adapted to be screwed into the rear end of the barrel and having a seat in the rear face of the plunger when the components are telescoped so that not only is the full ink capacity of the barrel utilised but the plunger being drawn against its seat constitutes an effective seal preventing leakage of ink at the rear end of the barrel or reservoir. Alternatively, the seat may consist of a ring of material cemented or secured by adhesive to the inner cylindrical wall of the barrel, preferably with a rearwardly extending sleeve also in contact with such cylindrical wall and providing an increased cemented area.

The rearward face of the ring or partition providing the seat for the plunger constitutes an abutment for the coil spring which urges the actuating member rearwardly when it is unscrewed along the plunger shank and which returns the plunger assembly to its rearmost position after depression of the fingerpiece, the other end of such coil spring engaging a shoulder formed by arranging an annular boss on the front end of the actuating member and washers of brass or other appropriate anti-friction material being positioned at each end of the spring if desired.

The plunger proper which is carried at the front end of its squared shank as in the aforementioned application conveniently is composed of two leather discs, one at each face, and an intermediate pad of felt impregnated with paraffin wax to lubricate the leather plunger and keep the leather flexible over long periods of use.

The set screw in the rear end of the plunger shank which constitutes a limit stop for the outward telescoping movement of the fingerpiece when unscrewed preparatory to a filling operation, is conveniently arranged to be flush with the end of the fingerpiece when the mechanism is closed at the conclusion of such operation, the end of the barrel or of the mounting plug forming an abutment for such fingerpiece to ensure that the plunger is drawn against its seat in order to provide

the effective seal aforementioned, to which end a washer may be included if desired between the seat and the plunger.

5 By the present invention improved and simplified filling mechanism for fountain pens especially so-called vacuum pens is obtained.

Dated the 9th day of November, 1945.

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COMPLETE SPECIFICATION

Improvements in and relating to Self-filling Fountain Pens

10 I, ERIC ERNEST SAMUEL WADE, a British Subject, of The Lang Pen Company Limited, 13, Hope Street, Liverpool, 1, in the County of Lancaster, 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:—

15 This invention relates to self-filling fountain pens with more especial reference to so-called vacuum self-filling pens in which the filling operation is effected by repeated manipulation of a small piston or plunger in the rear end of the ink reservoir.

20 An object of the present invention is to provide an improved construction of piston actuating mechanism in which although the piston is drawn rearwardly to conclude the filling operation and the maximum effective capacity of the barrel is utilised, there is no projecting shank requiring a removable cover, and the liability of leakage of ink from the rear end of the reservoir is minimised.

35 In mechanism according to the invention for actuating the piston of plunger of a self-filling fountain pen of the kind specified having a plunger with an actuating member carrying a finger piece for manipulation which are separate components and are arranged to be telescoped into each other after a filling operation to utilise the maximum effective capacity of the barrel and to obviate the necessity of a removable end cover, the telescoping components are carried in a plug or ferrule secured to the rear end of the barrel forming the ink chamber and are connected by formations on one member engaging helical means on the other for effecting the telescoping movements by rotation of the finger piece, and the rear end of the ink reservoir has a seat for the rear face of the piston against which the piston is pressed when the components are telescoped so as to provide an effective seal preventing leakage of ink at the rear end of the reservoir.

Advantageously the front end of the ferrule is screwed into the barrel and con-

stitutes the seat for the rear face of the piston, the telescoping mechanism and the plug thus forming a unit sub-assembly.

60 The plunger or piston rod and actuating member may be complementarily screw-threaded, and the plunger or piston may be positively held against rotation while being guided for longitudinal reciprocation.

70 Spring means may be interposed between a member associated with the piston and any appropriate fixed annular abutment on the body or barrel of the pen whereby during the filling operation the piston is automatically returned to its rearward position after depression of the finger piece so that the pen can be filled by manipulation with one hand only.

75 The piston rod may engage a hollow actuating member or the finger piece may mount a threaded stem engaging a hollow piston rod, and rotation of the piston during manipulation of the finger piece may be prevented by any suitable means acting preferably on the piston rod, such as a square aperture at the rear end of the reservoir guiding a piston rod of square external section.

80 The invention will be further described with reference to the accompanying drawings in which:—

90 Fig. 1 is a longitudinal section showing a vacuum pen according to the preferred embodiment in the closed or normal position.

95 Fig. 2 is a similar section showing the same pen with the finger piece retracted for filling.

100 Fig. 3 is a longitudinal section illustrating another embodiment of the invention.

Fig. 4 is a cross section on the line A—A of Fig. 3.

105 Referring now to the drawings and more particularly to Figs. 1 and 2, the rear end of the pen barrel 1 has screwed into it a ferrule 2 mounting the piston mechanism and at its front end a conventional nib section 3 carrying a feed 4 and air tube 5.

110 A piston 6 adapted to reciprocate in the rear of the ink reservoir 7 is secured by means of a screw 8 and a square boss 9

to a square hollow piston rod 10 which terminates in a finger piece 11. The finger piece is tapped at 12 to mount a coarse-pitch screw-threaded stem 13 which co-operates with internal threads 14 in the rear end of the piston rod.

The finger piece 11 is formed with a shoulder 15 and is externally shaped to form a smooth continuation of the external surface of the ferrule in the closed position, and the finger piece is also formed with an integral sleeve 16 which is guided by the bore of the ferrule.

An inward annular projection 19 constituting the front end of the ferrule has a front face which in the embodiment illustrated acts as a seat for the piston and a square aperture which guides the square piston rod and prevents rotation thereof which might otherwise take place when the finger piece is rotated.

A compression spring 20 is interposed between the projection 19 and a flange 21 at the rear end of the piston rod so as to urge the piston rearwardly.

The piston is composed of two leather washers or discs 22, 23 and an intermediate pad of felt 6 impregnated with paraffin wax to lubricate the leather washers, prevent corrosion by the ink and keep them flexible over long periods of use.

For filling, the finger piece is unscrewed along the piston rod until a limit stop flange 24 formed on the inner end of the screwed stem 13 abuts with the tapped portion 14 on the piston rod. The finger piece is then reciprocated to draw in ink. After the piston has been reciprocated a number of times to fill the pen, the finger piece is screwed inwardly until the flange of the rear leather washer 23 is deformed against its seat on the projection 19 to provide an effective seal. There being no loose parts, the whole operation, including rotation of the finger piece may, if desired, be carried out with one hand.

As will be understood, the mechanism when telescoped is accommodated within the length of the ferrule with only the piston projecting at one end and the finger piece at the other, and is a neat and compact unit sub-assembly. The parts are assembled by screwing the stem 13 through the hollow piston rod from the rear, fitting the finger piece and then sliding the piston rod through the square aperture in projection 19 before attaching the piston to its front end and screwing the ferrule with the piston assembly into the barrel.

Referring now to the modified embodiment illustrated in Figs. 3 and 4, a square hollow piston rod 30 rides in the square aperture in projection 19, and has its four corners rounded, as shown in Fig. 4, and threaded over most of their length to en-

gage a simple tubular actuating member 31 tapped at its front end and having an external cylindrical surface guided by the bore of the ferrule. The front end of the hollow piston rod 30 is tapped to receive a bolt 32 whereby it is secured to a solid piston composed of two fibre discs 33 and an intermediate graphited disc 34.

The presence of a limit stop 35 at the rear end of the piston rod necessitates a perforation 36 in the finger piece through which the piston rod is introduced during assembly and prior to insertion of the telescoping parts into the ferrule and mounting of the piston. After assembly the aperture 36 is closed by a plug 37.

It will be appreciated that either of the embodiments described may be constructed with or without the return spring, and such spring may be mounted in front of the piston instead of to the rear thereof, provision being made against wear of the reservoir walls. Furthermore, antifriction washers may be mounted at the ends of the spring if required.

The annular projection 19 may be formed as a separate member and cemented to the barrel or the ferrule, or it may be integral with the barrel.

Sealing of the reservoir may be achieved by shaping the front face of the projection 19 as a conical seat adapted to co-operate with a solid piston having a conical rear face.

The screw threads connecting the telescoping members may be substituted by a pin on pins guided by a single or multiple differential spiral groove having a coarse pitch at the centre for rapid telescoping movement and fine pitch at both ends to ensure locking of the piston in the sealing position as well as to prevent unwanted rotation of the finger piece during reciprocation.

Instead of being of square section as described with reference to the drawings, the piston rod may be cylindrical and may for instance be formed with a longitudinal groove engaging a projection or captive ball on the annular member 19 to prevent relative rotation during manipulation of the finger piece.

Cork may advantageously be employed in the construction of the piston particularly in the form of impregnated lubricating washers, and it will be appreciated that stylo or ordinary nibs may be employed.

By the present invention improved and simplified filling mechanism for fountain pens especially so-called vacuum pens is obtained.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to

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be performed, I declare that what I claim is:—

1. Mechanism for actuating the piston or plunger of a self-filling fountain pen of the kind specified having a plunger with an actuating member carrying a finger piece for manipulation which are separate components and are arranged to be telescoped into each other after a filling operation to utilise the maximum effective capacity of the barrel and to obviate the necessity of a removable end cover, wherein the telescoping components are carried in a plug or ferrule secured to the rear end of the barrel and forming the ink chamber and are connected by formations on one member engaging helical means on the other for effecting the telescoping movements by rotation of the finger piece, and wherein the rear end of the ink reservoir has a seat for the rear face of the piston against which the piston is pressed when the components are telescoped so as to provide an effective seal preventing leakage of ink at the rear end of the reservoir.

2. Mechanism according to claim 1 wherein the front end of the ferrule is screwed into the barrel and constitutes the seat for the rear face of the piston, the telescoping mechanism and the plug thus forming a unit sub-assembly.

3. Mechanism according to either of the preceding Claims wherein the plunger and actuating member are complementarily screw-threaded, and the plunger or piston is positively held against rotation while being guided for longitudinal reciprocation.

4. Mechanism according to any of the preceding claims having spring means interposed between the barrel or ferrule and a member associated with the reciprocating piston whereby during a filling

operation the piston is automatically returned to its rearward position after depression of the finger piece so that the pen can be filled by single-handed manipulation.

5. Mechanism according to any of Claims 2 to 4 wherein the front end of the ferrule constituting a seat for the piston has a non-circular aperture which guides the plunger or piston rod of similar outer cross section while preventing its rotation.

6. Mechanism according to any of the preceding claims including a screw-threaded plunger or piston rod, wherein the piston rod is of generally square outer section and is guided in a similarly shaped aperture to prevent its rotation while its corners are rounded and threaded to engage a tapped sleeve on the actuating member or finger piece for the telescoping action.

7. Mechanism according to any of claims 2 to 6 wherein one of the telescoping members carries a limit stop defining the extent to which the finger piece may be unscrewed rearwardly and thereby preventing detachment thereof.

8. Mechanism according to any of the preceding claims wherein the piston comprises a pair of discs or washers and an intermediate impregnated pad to maintain such discs lubricated over long periods of use.

9. Actuating mechanism for self-filling vacuum fountain pens constructed and arranged for use substantially as described with reference to the accompanying drawings.

Dated this 9th day of September, 1946.

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47, Victoria Street, London, S.W.1,
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[This Drawing is a reproduction of the Original on a reduced scale.]

