

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.



### Improvements in Fountain Pens.

We, GEORGE STEWART VIVIAN, of 237, Norbury Crescent, Norbury, London, S.W. 16, a British Subject, and T. B. FORD LIMITED, of Snakeley Paper Mill, Loudwater, High Wycombe, Buckinghamshire, a British Company, 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:—

Our present invention relates to fountain pens of the type in which the quill and nib can be retracted into the tubular body of the pen when the pen is not in use. The object of our invention is to provide improved means whereby the mechanism or device provided for the retraction of the quill and nib can be utilised for charging the pen reservoir with ink, and in which the pen can be completely filled with ink. A further object is to prevent leakage of the ink when the nib is retracted.

Our invention is broadly characterised in that the nib and nib holder and the mechanism for retracting the same can be utilised for charging the pen with ink by moving them to and fro in the pen body.

According to an embodiment of our invention a piston is slidably mounted in the pen reservoir and contiguous to the nib holder, means being provided for retracting the piston and nib holder into the reservoir and for reversing their direction of travel, an ink flow passage being provided in the said piston which is opened when the propelling movement of the nib holder to the writing or extended position is initiated so that ink can flow readily to the nib, said passage being automatically closed as the nib holder is retracted into the reservoir but being automatically opened as the nib holder is moved in the reverse direction whereby if the nib receiving end of a pen is immersed in ink during the outward movement of said piston ink is drawn through the piston into the gradually increasing space above the piston so that the reservoir becomes charged with ink.

In the preferred form of our invention a slight lost motion is provided be-

tween the nib holder and the said piston whereby the nib holder is moved in advance of the piston when retracting them, said lost motion providing on retraction of the nib holder a movement of the nib holder relative to the piston which seals an ink passage in the piston communicating with a space around the nib holder when the pen is in use, the piston being carried by a tubular rod connected to means for sliding it axially in both directions inside the reservoir, an air vent being provided in the end of said tubular rod remote from the piston and through which air in the reservoir is ejected into an air escape passage in the quill of the pen on retraction of said piston, said air vent being above the level of the ink in the reservoir when the pen is in use whereby air can enter the reservoir to replace the used ink.

The tubular rod of the piston can be fed axially by a worm or spiral groove or slot device, for instance a spirally slotted tube rotatable about the piston rod and receiving in its slot a lateral projection on the end of the piston rod, such projection sliding in a straight slot in a fixed sleeve surrounding the said slotted tube, the slotted tube being rotated by a milled or other suitable head abutting against the closed end of the reservoir and fixed to a spigot extending from the tube through such end of the pen reservoir.

In order that our invention may be clearly understood and readily carried into effect we have appended hereto a sheet of drawings illustrating one embodiment of our invention, and wherein:—

Fig. 1 is an elevation of the pen not in use.

Fig. 2 is a part section of Fig. 1.

Fig. 3 is a sectional elevation of the pen when about to be used.

Fig. 4 is a detail sectional elevation showing the relative positions of the nib holder and the said piston during their retraction, and

Fig. 5 is a detail sectional elevation showing the relative positions of the nib holder and the said piston during the operation of advancing them to the writing position.

Referring to the drawings, it will be seen that when the pen is not in use and the cap 1 is fitted on the reservoir or pen body 2, the length of the pen is less than  
 5 that which it occupies when it is in use, due to the nib 3 with its quill 4 and holder 5 having been retracted as a single unit into the reservoir 2.

The retraction of the nib and its holder  
 10 can be effected by rotating a head 6 fixed to a spigot 7 rotatable in the closed end of the reservoir and fixedly extending from one end of a tube 8 concentrically  
 15 rotatable within a sleeve 9 fixed in the reservoir. A spiral slot 10 is formed along the tube 8 and receives a pin 11 projecting laterally from one end of a tubular rod 12 connected at its other end to the  
 20 quill 4. The pin 11 slides in a straight slot 13 in the fixed sleeve 9, so that rotation of the spirally slotted tube 8 feeds the rod 12 axially.

The tubular rod 12 is formed with a flange like head 14 slidable in a short  
 25 cylindrical chamber 15 in the quill 4, this head 14 being adapted to abut against the outer end of the chamber 15 to project the nib to the writing position and to abut against an annular headed nut 16 at the  
 30 inner end of the chamber 15 to retract the nib into the reservoir.

Disposed with a slight annular clearance 17 about the quill 4 is a piston 18  
 35 which slides as a close fit in the reservoir 2. This piston is formed in its outer end with a conical seating 19 in which is adapted to seat a conical face 20 on the  
 40 inner end of the nib holder 5 when the nib is being retracted, so that ink will not flow through the passage 17 into a narrow annular space 21 around the  
 45 holder 5 to the nib during such retraction. This face and seating are brought into contact during retraction of the nib soon after the head 14 of the rod 12 engages the nut 16 and they are separated as a preliminary to the drawing of ink  
 50 into the reservoir when the head 14 of the rod 12 engages the outer end of the chamber 15 in the quill. Air displaced by the retraction of the piston escapes through a vent hole 22 in the tubular rod  
 55 12 into the chamber 15 and out through a restricted passage 23 in the quill 4. When the nib is retracted ink cannot escape through the passage 23 because should the pen be held nib downwards in this condition the level of the ink will be beneath the air vent 22 and the flanged head 14 of  
 60 the tubular piston rod effectively seals the inner end of the chamber 15. Also should the knob or head 6 be slightly turned when the nib is retracted, the head 14 would slide idly along the chamber  
 65 15 so that the nib 4 would not have

its point forced against the cap 1 and become damaged. The distance of the air  
 vent hole 22 from the piston 18 determines the volume of ink that can be drawn into  
 70 the reservoir. When the ink reaches the level of the air vent, further operation of piston 18 will cause the excess of ink drawn in thereby to be ejected through the air vent 22, tube 12 and passage 23.  
 75 The increased resistance to operation which will now be felt will indicate that the reservoir has been filled.

It will be understood that ink is drawn into the reservoir during outward movement of the piston, a diametrical pin 24  
 80 on the tubular rod 12 providing the necessary abutment for pushing the piston along the reservoir during this stage, the space between the conical face 20 and seating 19 providing the ink outlet for writing purposes and the inlet for  
 85 charging purposes.

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  
 90 claim is:—

(1). A fountain pen of the type set forth characterised in that the mechanism for retracting the nib into the pen  
 95 body also acts to charge the pen with ink.

(2). A fountain pen according to claim 1 characterised in that an ink flow passage connecting the reservoir of the pen  
 100 to the nib is automatically closed upon retraction of the nib into the pen.

(3). A fountain pen of the type set forth wherein a piston is slidably  
 105 mounted in the pen reservoir and contiguous to the nib holder, means being provided for retracting the piston and nib holder into the reservoir and for reversing their direction of travel, an ink flow passage being provided in the said  
 110 piston which is opened when the propelling movement of the nib holder to the writing or extended position is initiated so that ink can flow readily to the nib, said passage being automatically closed as  
 115 the nib holder is retracted into the reservoir but being automatically opened as the nib holder is moved in the reverse direction whereby if the nib receiving end of a pen is immersed in ink during the  
 120 outward movement of said piston ink is drawn through the piston into the gradually increasing space above the piston so that the reservoir becomes charged with ink.

(4). A fountain pen of the type set forth according to claim 2 or 3 wherein  
 125 an air passage in the slidable nib carrying part of the pen communicates with the interior of the pen reservoir and for both vertical positions of the pen is separ-  
 130

ated from the ink charged space within the pen reservoir but admits air to the space above the ink level when the pen is in the writing position.

5 (5). A fountain pen of the type set forth according to claim 4 wherein said air passage passes through the quill of the pen into a tubular rod extending along the interior of the reservoir and connected to means for retracting the nib  
10 carrying part into the reservoir, an air vent being provided in said rod at the end remote from the quill.

(6). A fountain pen of the type set forth according to claims 3 and 5 wherein  
15 said rod has an enlargement at one end slidable in a chamber in the quill of the pen and prevents ink from flowing through the air passage in the quill.

20 (7). A fountain pen of the type set forth according to claim 3 wherein the said piston is adapted to be engaged by the nib carrying part of the pen during the retraction of such part, a slight lost

motion being provided between said part and the piston whereby during the writing condition of the pen there is a space between said part and said piston for the passage of ink from the reservoir through an opening in the piston to the nib carrying part, said opening being closed by the nib carrying part at the commencement of the operation of retracting said part into the reservoir.

(8). A fountain pen of the type set forth according to claim 7, wherein the inner end of the nib carrying part of the pen is formed with a conical face adapted to engage a conical seating in the piston, the said face and seating being separated  
40 when the pen is in the writing condition.

(9). A self-filling fountain pen substantially as described with reference to the accompanying drawings.

Dated this 31st day of October, 1930.

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*Fig. 1. Fig. 2. Fig. 3. Fig. 4.*

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

