



# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION.

### Improvements in or relating to Fountain Pens.

5 We, WYVERN FOUNTAIN PEN COMPANY LIMITED, a British Company, of Woodboy Street, Leicester, and DAVID HARRISON, a British Subject, of the Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

10 This invention relates to fountain pens and particularly to the ink feed arrangements thereof.

15 Some fountain pens have hitherto been provided with ink feeding arrangements in which flooding of ink from the nib is substantially avoided even when the pen is subject to changes of altitude or temperature and in which the writing point is maintained in a moist condition when the pen is not in use. It is an object of the present invention to provide an improved arrangement of this kind.

20 According to the invention there is provided an ink feed device for a fountain pen comprising a feed bar having a longitudinal ink feed channel on a portion of its surface ; a transverse gap or a recess on another portion of its surface communicating with the said channel through a peripheral groove, and a longitudinal air bore which extends the length of the feed bar, is open at both ends, and intersects the said transverse gap or slot.

25 There is also provided by the invention a feed bar for a fountain pen comprising a substantially cylindrical body having a longitudinal ink feed channel in a portion of its surface, a semi-cylindrical gap or recess in a diametrically opposite portion of the said surface, a peripheral groove of smaller cross sectional area than the channel connecting the channel with the semi-cylindrical gap or recess, and a central air bore extending the entire length of the body and intersecting the said recess.

45 Such a feed bar is adapted to be inserted  
[Price 2/-]

in a suitable tubular nib together with which it can conveniently be housed in, and shrouded by, a tubular extension of the barrel of a fountain pen.

In the accompanying diagrammatic drawings :—

Figure 1 is a longitudinal section of the forward part of a fountain pen incorporating an ink feed device according to the invention.

Figures 2 and 3 are respectively a plan view and a side elevation of a feed bar thereof, and

Figure 4 is a transverse section (to an enlarged scale) on line  $x-x$  of Figure 3.

In the illustrated embodiment, an ink feed device of a fountain pen comprises a cylindrical feed bar 1 adapted to be fitted inside a tubular nib 2 which is itself located in and shrouded by a suitable tapering nib-holder section 3 screwed into the forward end of a barrel 4 of the pen. The upper surface of the feed bar 1 (when considered in its normal position of use) is formed with an ink feed channel 5 which extends from the inner or rear end of the feed bar along the greater part of the length thereof and serves to connect in known manner the ink reservoir of the pen, e.g. a flexible sac 6, with the usual capillary aperture 7 at the rear end of the slit or divided portion 2a of the nib 2. The under side of the feed bar 1 is formed with a transverse gap or recess 8 extending to the longitudinal axis of the feed bar so as to provide a semi-cylindrical cavity. This cavity 8 is connected to the channel 5 by part circumferential grooves 9, which may be considered as a single semi-circumferential groove, these grooves being of slightly less cross-sectional area than the channel 5. A fine bore 10, serving as an air passage extends completely through the feed bar and co-axially with the longitudinal axis thereof and intersects the transverse gap or recess 8. The rear or inner end of the bore 10 is enlarged to receive as a press fit a tube 11 extending into the reservoir 6 for which it serves as a breather tube in known manner.

The forward or outer end face 12 of the feed bar is inclined downwards and backwards so that, when the bar is inserted in the nib-holder section 3, this face lies in the same plane as similarly inclined surfaces of the holder in order to provide for an adequate clearance between the pen and a surface being written on.

When it is desired to charge with ink a fountain pen in which the device is fitted, air is first expelled through the air tube 11 and bore 10 by operation of any suitable filling device (not shown) and ink is then sucked with little or no restriction into the reservoir 6 through the bore 10 and tube 11. During writing, ink flows along the channel 5 to the capillary aperture 7 and thence along the slit in the nib to the writing point. If the ink flow is excessive, the peripheral grooves 9 fill and, if the excess flow continues, ink is then passed into the transverse gap or recess 8 until the air passage or bore 10 is blocked by the ink. As the ink continues to flow, a depression forms in the reservoir with the result that the ink flow decreases until it is less than that required for writing. Ink is then drawn to the nib from the grooves 9 and gap or recess 8 owing to capillary action and this continues until the air passage 10 is cleared whereupon air is again free to enter the reservoir and the ink flow resumed.

The ink flow is substantially constant as the air feed to the reservoir through the bore 10 and tube 11 is separate from the ink feed to the nib through the channel 5.

When the pen is not in use and is held in the carrying position, i.e. with the nib uppermost, ink will return to the reservoir 6 from the inner or rear portion of the feed channel 5, any ink that may be in the transverse gap or recess 8 also returning via the bore 10 and tube 11. The rear part of the feed channel 5, the peripheral grooves 9 and the ink recess 8 provide a connexion to atmosphere so that changes in atmospheric pressure and temperature, for instance due to changes in altitude, can be accommodated substantially without affecting ink level in the

reservoir 6. Thus, the danger of flooding of the nib due to variations of ink level is substantially avoided. Furthermore, the writing point is kept moist and ready for immediate use by ink held under surface tension in the forward portion of the feed channel 5 i.e. that portion extending forwardly of the peripheral grooves 9.

In an actual embodiment of the invention the dimensions are as follows; the feed bar 1 is .145 inch diameter; the longitudinal ink feed channel 5 is .040 inch wide and .025 inch deep; the part circumferential grooves 9 are each .020 inch wide and .020 inch deep; the cavity 8 is .040 inch wide and has a maximum depth of .065 inch.

What we claim is:—

1. Ink feed device for a fountain pen comprising a feed bar having a longitudinal ink feed channel on a portion of its surface; a transverse gap or a recess on another portion of its surface communicating with the said channel through a peripheral groove, and a longitudinal air bore which extends the length of the feed bar, is open at both ends, and intersects the said transverse gap or slot.

2. A feed bar for a fountain pen comprising a substantially cylindrical body having a longitudinal ink feed channel in a portion of its surface, a semi-cylindrical gap or recess in a diametrically opposite portion of the said surface, a peripheral groove of smaller cross-sectional area than the channel connecting the channel with the semi-cylindrical gap or recess, and a central air bore extending the entire length of the body and intersecting the said recess.

3. Ink feed device for a fountain pen substantially as herein described with reference to the accompanying drawings.

4. Fountain pen having an ink feed device or feed bar according to any of the preceding claims.

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#### PROVISIONAL SPECIFICATION.

### Improvements in or relating to Fountain Pens.

We, WYVERN FOUNTAIN PEN COMPANY LIMITED, a British Company, of Woodboy Street, Leicester, England, and DAVID HARRISON, a British Subject, of the Company's address, do hereby declare the nature of this invention to be as follows:—

The invention relates to fountain pens and more particularly to the ink feed arrangements of fountain pens in which a large part of the nib is received in and shrouded by a forward extension of the barrel of the pen.

The invention provides means by which flooding of ink from the nib is substantially avoided even when the pen is subjected to changes of altitude and temperature and for maintaining the writing point in a moist condition when the pen is not in use.

The invention consists in providing a circumferential channel around the feed bar of the pen which intersects an ink flow channel on the upper side of the feed bar and communicates with a transverse slot or recess on

the underside of the feed bar and in providing a separate air passage connecting the ink reservoir with the atmosphere and intersecting the transverse slot or recess.

5 An example of a fountain pen according to the present invention is formed with a holder for a part-tubular nib and an ink feed arrangement adapted to be attached by a reduced threaded portion to the barrel and  
0 ink reservoir of the pen. The outer surface of this holder is tapered towards the end away from the barrel and the holder has a central bore from end to end corresponding in diameter to the outside diameter of the  
5 shank of a tubular nib which is pressed into the bore until only a short non-tubular portion at the writing tip end remains exposed.

10 Inside the tubular nib the feed bar is fitted and this bar has a tapered outer end surface. An ink feed passage or channel along the upper side of the feed bar connects the ink reservoir with the normal capillary aperture terminating the divided portion of  
15 the nib's writing tip. A part circumferential channel of slightly less width and depth than the ink feed passage or channel intersects the latter and connects it with a transverse slot or groove cut across the  
20 underside of the feed bar. The depth of the transverse slot is such that the top of the slot is on a diameter of the feed bar, forming a half-cylindrical cavity connected to the ink feed passage on each side around the remain-  
25 ing circumference of the feed bar by the part circumferential channel described above.

30 An axial air passage extending from the tapered end surface throughout the feed bar, intersects the transverse slot at the top of the half-cylindrical cavity and is provided at the inner end with an air tube projecting into the ink reservoir in known manner. The inclined end surfaces of feed bar and holder provide adequate clearance between these  
35 surfaces and the paper being written upon. Means of any suitable known construction for filling the ink reservoir may be provided. During filling air is first expelled through the air tube by the filling means and then ink is  
40 drawn into the reservoir through both the air passage and the ink feed passage with little or no restriction.

During writing ink flows down the ink flow passage to the capillary aperture in the nib and thence by the slitted portion to the  
55 writing tip. If an excess quantity of ink tends to flow down the ink flow passage the part-circumferential channel around the feed bar fills and if the flow is still excessive ink is passed into the transverse slot, blocking  
60 the air passage so that a depression is formed in the ink reservoir as ink continues to flow. This depression restricts the flow of ink until it is less than that required for writing. Capillary action then causes the nib to draw  
65 ink from the transverse slot through the part-circumferential channel until the blockage of the air passage is removed when air is again admitted to the ink reservoir permitting the ink flow to re-commence.  
70

When the pen is not in use and turned into the carrying position with the nib uppermost, the ink in the inner part of the feed passage returns to the reservoir, any ink in the transverse passage returns via the air passage and tube to the ink reservoir and the ink reservoir  
75 itself is provided with a connection to the atmosphere by which changes in atmosphere, pressure and temperature, for instance due to changes in altitude, can be accommodated  
80 substantially without affecting the ink level in the reservoir and thus avoiding the danger of flooding that would arise from variations of ink level.

Again when the pen is not in use the  
85 writing point is kept moist ready for immediate use by the ink held by surface tension in the fore-part of the feed passage between the nib and the part-circumferential channel.  
90

This structure according to the present invention provides a free and substantially constant flow since the air feed to the reservoir is distinct from the ink flow passage and clogging by ink sediment and dirt, is  
95 avoided.

Dated this 19th day of January, 1949.

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

