May 9, 1961 D. J. SILVER 2,983,254

FOUNTAIN PENS

Filed April 22, 1959

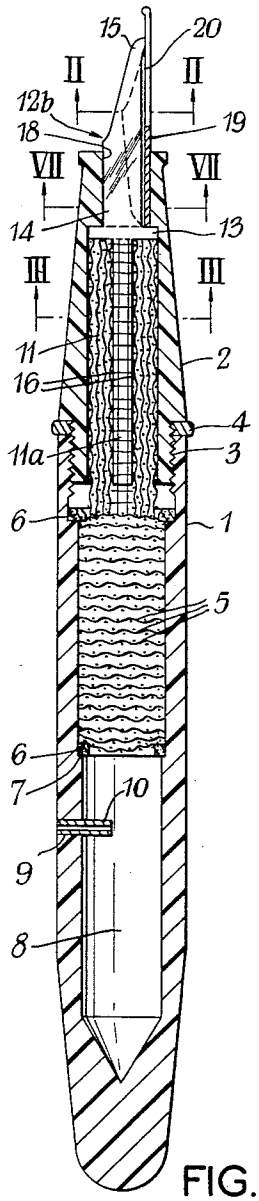


FIG.1

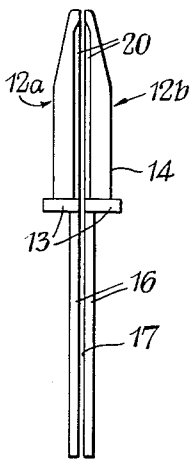


FIG.4

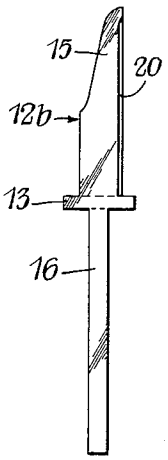


FIG.5

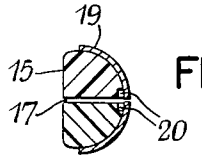
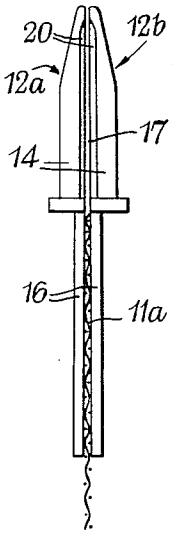


FIG.2

FIG.6



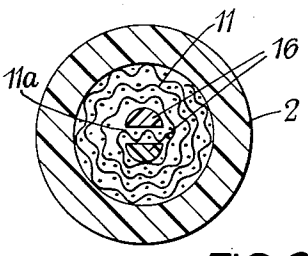


FIG.3

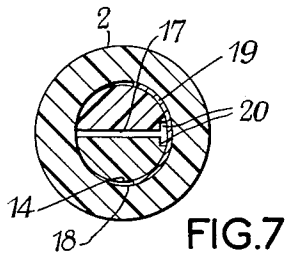


FIG.7

Inventor
Derrick John Silver
By Peck & Peck
Attorneys

United States Patent Office

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FOUNTAIN PENS

Derrick John Silver, Letchworth, England, assignor to Mentmore Manufacturing Co. Limited, London, England, a company of Great Britain

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5 Claims. (Cl. 120—50)

This invention relates to fountain pens of the kind (hereinafter referred to as "the kind specified") in which capillary action alone is utilised for filling the ink reservoir, for retaining ink therein and for feeding ink from the reservoir to a writing surface when the pen is in use, the reservoir being provided with a filling composed of woven, knitted or other fabric formed from fibres which may be either capable or incaple of themselves absorbing ink. The filling may be in the form of a stack of discs cut from the fabric, for example.

It is usual in such pens to provide a wick of braided or woven fibres which is in close contact with the nib of the pen and also with the ink-storing filling of the reservoir, this wick performing the function of the feed-bar in a fountain pen of the well-known form which is adapted to be filled with ink by suction of some other means not replying solely on capillary action.

This wick-free is not entirely satisfactory because the rate of travel of the ink along the same is much lower than can be secured with a conventional feed-bar and because the material of the wick-feed is liable to become progressively less absorbent during the life of the pen due to clogging of its interstices with sold constituents of the ink. In addition, the high degree of capillarity of the wick-feed necessitates greater accuracy in the formation of the slit in the nib, which slit must be narrower than is required in most conventional pens.

The chief difficulty in attempting to provide a feed-bar formed from a solid material such as vulcanite or one of the plastics for use in a pen of the kind specified stems from the necessity for matching the ink-feed channels or grooves of the feed-bar to the capillary filling of the reservoir in such a way that free and easy transfer of ink from the one to the other can occur. The dimensional matching of the width of the channels or grooves to the capillary filling has proved to be so critical that no commercially satisfactory feed-bars have yet been produced for such pens.

It is the object of the present invention to provide a solution of this difficulty.

According to the invention a solid feed-bar for a fountain pen of the kind specified is formed in at least two separate parts which are placed together side-by-side to leave a longitudinally extending capillary ink-feeding gap between them and the transverse dimension of the gap is determined by sandwiching between the adjacent faces of the parts a sheet of the fabric to be employed to consitute the filling of the reservoir of the pen.

In this way it is ensured that the capillarity of the ink-feeding gap provided by the assembled feed-bar is closely similar to the capillarity of the filling for the reservoir so that ink will pass freely from the gap to the filling and vice versa. Moreover, the ink will travel at a sufficiently high rate along the feed-bar to ensure that an adequate supply of ink is always available at the nib slit whenever the pen is required for use.

The filling of the reservoir may be a stack of a large number of discs formed from an ink-absorbent material,

such as cellulose or cotton, but it is preferred to employ a stack of discs formed from a fabric composed of fibres which are themselves incapable of absorbing ink, such as nylon fibres. The nib section of the pen may be filled with a spirally rolled length of fabric instead of with stacked discs. This rolled length may be wound around a portion of the feed-bar and may constitute an extension of the sheet of fabric sandwiched between the parts of the bar.

The co-operating parts of the feed-bar according to the invention may be held in assembled relation by inserting them into the mouth of the nib section or they may be secured together by any suitable means so that the feed-bar may be handled conveniently as a unit.

An example of a fountain pen embodying the invention will now be described in greater detail with reference to the accompanying drawings, wherein:

Fig. 1 is a longitudinal section of the pen with its nib-protecting cap removed,

Fig. 2 is a section taken on the line II—II of Fig. 1,

Fig. 3 is a section taken on the line III—III of Fig. 1,

Fig. 4 is a front elevation showing the two parts of the feed-bar embodied in the pen of Fig. 1,

Fig. 5 is a side elevation of one of the parts showing the inner face thereof,

Fig. 6 is a front elevation showing the parts of Fig. 4 as they would appear when in position in the pen, and

Fig. 7 is a section taken on the line VII—VII of Fig. 1.

The fountain pen shown comprises a barrel **1** and nib-section **2** which are connected together at a screw-threaded joint **3** with the interposition of a ring **4** for engagement by the cap of the pen when this is applied. The barrel **1** is closed at the end remote from the joint **3** and has a portion of its length filled with a stack of fabric discs **5** held in place between retaining rings **6** each having one of the fabric discs secured thereto. The inner ring **6** abuts against shoulder **7** formed between the wall of the fabric-filled portion of the barrel **1** and the wall of a slightly narrower air chamber **8** which is yet of such a cross-sectional area that ink cannot form a stable meniscus therein. An air vent **9** formed in the wall of the barrel is fitted with a length of plastics tube **10** which extends radially inwards to about the axis of the chamber **8** to constitute an ink baffle.

In the nib-section of the pen is accommodated a further filling of fabric in the form of a spiral roll **11** which has its one end in firm contact with the endmost disc **5** of the stack in the barrel **1** and its other end in contact with the inner end face of a feed-bar composed of two cooperating parts **12***a* and **12***b*.

The parts of the feed-bar, when placed together with their flat inner faces facing each other but spaced apart by a short distance corresponding to the desired width of a capillary ink-feeding passage, produce a feed-bar resembling that of a conventional fountain pen. There is a portion extending forwards from an annular collar **13** which is of substantially cylindrical shape at **14**, adjacent to the collar but is tapered off from one side towards its tip to produce the inclined face **15**. Extending rearwards from the collar **13** is a substantially cylindrical rod-like portion **16** of smaller diameter than the forward portion and of a length approximately equal to that of the cavity in the nib-section which is filled by the rolled fabric **11**.

In order that the width of the capillary ink-feeding passage **17** left between the two parts of the feed-bar may be correctly matched to the capillary filling **11** of the nib-section, the spacing apart of the two parts **12***a*, **12***b* of the feed-bar is determined by sandwiching between them a layer of the fabric utilised for making this filling. Although the sandwiched layer of fabric could be arranged

to extend for the full length of the capillary passage **17**, it is preferred to arrange it at the rearward end only of the feed-bar so that the passage **17** may be narrowed towards the tip of the feed-bar by pressing the parts of the latter together.

In the example illustrated, the sandwiched layer of fabric is the inner end **11***a* of the roll **11**. The fabric being rolled around the rod-like part **16** of the composite feed-bar and the capillary passage **17** being filled with the sandwiched layer from the free end of the part **16** down to the collar **13**.

The two parts of the feed-bar could be secured together by any suitable means but a preferred arrangement is that illustrated. In this case the nib end of the nib-section is formed with an axially directed cylindrical passage **18** adapted to receive the cylindrical forward portion **14** of the feed-bar together with the shank of the nib **19** as a tight press fit. The feed-bar is inserted into the nib-section **2** through the screw-threaded end thereof and advanced until the nib **19** can be positioned on the projecting tapered forward end of the bar from the nib end of the nib-section. The bar is then forced home and the tight grip exerted on the forward end of the bar by the encircling portion of the nib-section causes the tips of the parts **12***a* and **12***b* to come into contact, with a consequent progressive narrowing of the capillary passage **17** along the length thereof from the zone where its width is determined by the sandwiched layer **11***a* of fabric.

The collar **13** forms a stop limiting the extent to which the feed-bar may be forced through the passage **18** in the nib-section and the nib **19** is naturally arranged on the feed-bar so that the passage **17** in the latter extends longitudinally beneath the usual slit in the nib with its one pair of edges spaced but a short distance from the edges of the nib-slit. As shown, this pair of edges of the passage **17** are rabbeted from the collar **13** almost to the free end of the feed-bar in order to form an auxiliary capillary channel **20** beneath the nib.

It will be understood that the fountain pen is filled with a charge of ink merely by immersing the nib and feed-bar in a supply of the ink for a sufficient period of time, the ink being elevated into the interstices of the fabric fillings **5** and **11** by capillary action. The capillarity of the passage **17** in the feed-bar is closely similar to that of the fabric fillings and ink will pass freely from the passage to the filling and vice versa.

What I claim is:

1. A multi-partite feed for the nib of a capillary fountain pen having an ink-storing space filled with sheet fabric formed from fibres by weaving, knitting and like operations, comprising a first part constituted by a sheet of said fabric disposed so that its medial plane bisects the nib longitudinally and two separate solid parts disposed one at each side of said first part and each extending beneath and in close contact with said nib, each solid part having a plane face in close contact with the respective adjacent surface of said first part so that said faces define between them a capillary ink-feeding gap of a width determined by the thickness of said first part.

2. A capillary fountain pen having an ink-storing space filled with sheet fabric formed from fibres by weaving, knitting and like operations and a nib to be fed with ink from said space, including ink-feeding means of multi-partite construction composed of a first part constituted by a sheet of said fabric disposed so that its medial plane bisects the nib longitudinally and two separate solid parts disposed one at each side of said first part and each extending beneath and in close contact with said nib, each solid part having a plane face in close contact with the respective adjacent surface of said first part so that said faces define between them a capillary ink-feeding gap of a width determined by the thickness of said first part.

3. A multi-partite feed for a nib of a capillary fountain pen having an ink-storing space adjacent the nib filled with a spirally rolled sheet of an open-mesh fabric, comprising two separate solid parts extending at one end within the first convolution of said spirally rolled sheet and at the other end beneath said nib, plane faces on said solid parts facing each other and parallel to a medial plane bisecting said nib longitudinally, and a third part constituted by the end portion of said first convolution clamped between said plane faces at said one end of said solid parts to space said faces apart by the thickness of said end portion whereby said faces define a capillary ink-feeding gap which at said other end of said solid parts extends longitudinally beneath said nib.

4. A multi-partite feed according to claim 3, wherein said solid parts extend through an aperture in a casing part of the fountain pen and are tightly wedged in said aperture to urge said plane faces into clamping relation with said third part.

5. A multi-partite feed according to claim 3, wherein said plane faces of said solid parts are rabbeted at said other end of said parts to form an auxiliary capillary channel beneath the nib.

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