

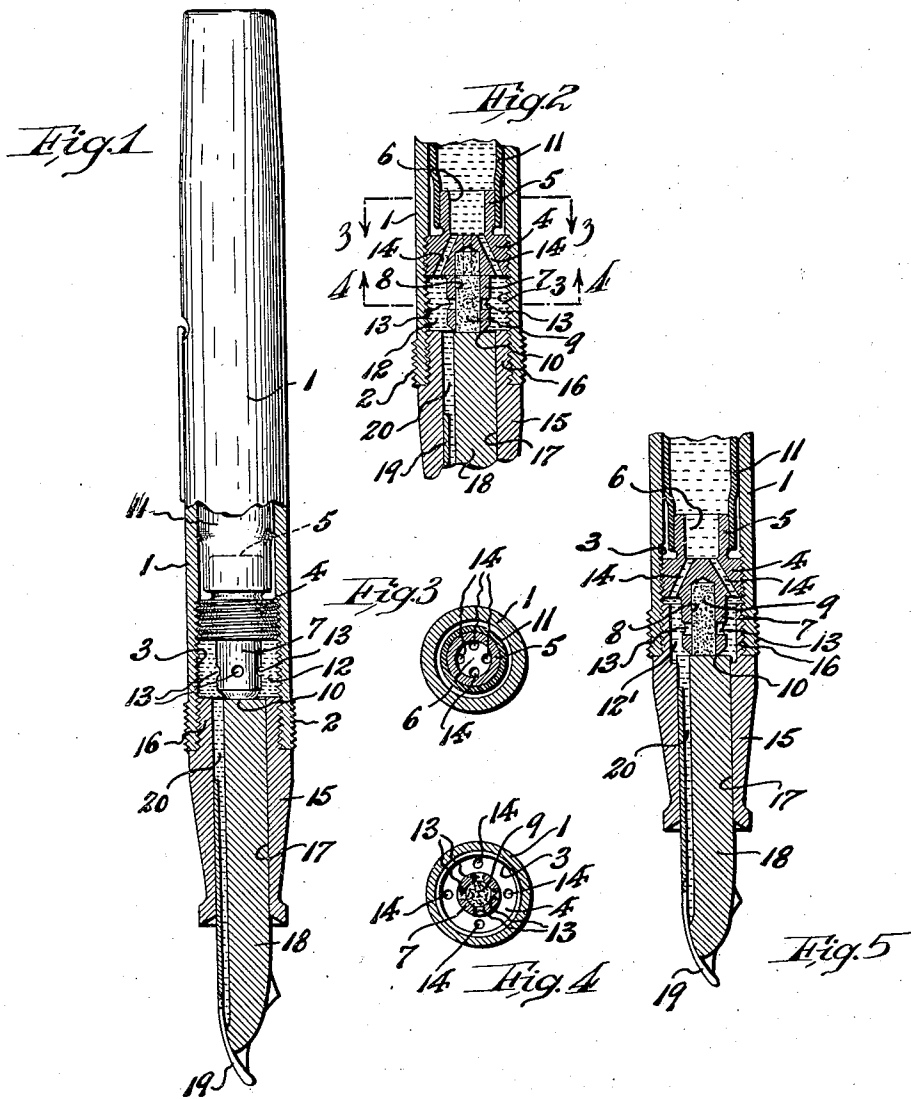
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SOLUBLE INK FOUNTAIN PEN

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SOLUBLE INK FOUNTAIN PEN

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3 Claims. (Cl. 120—42)

This invention relates to improvements in fountain pens of the type in which a writing fluid is formed by flowing water in contact with soluble ink material; the resultant writing fluid being delivered to the pen nib for writing operations therewith.

This invention has for its principal object to provide a pen of the kind described, the structure of which is greatly simplified, and which is characterized by the provision of a novel means for holding soluble ink material intermediate a water supply reservoir and the pen nib feed means, while at the same time providing means for conducting water from the supply to the pen nib feed means in such manner that the water so delivered first makes contact with the ink material to combine therewith in the formation of a writing fluid for final delivery to the pen nib.

The invention has for a further object to provide an ink holding means as above mentioned, which is adapted to conserve the ink material against undue dissolution, especially when the pen is upturned to non-writing position, as ordinarily carried in the pocket; in which position the water is returned to the supply reservoir, and thus kept out of contact with the ink material except during the periods of use of the pen for writing operations.

Other objects of this invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

Illustrative embodiments of this invention are shown in the accompanying drawing, in which:—

Fig. 1 is in part a vertical longitudinal section and in part a side elevation showing one arrangement of the novel ink holding and water flow controlling means according to this invention, said latter means being shown in side elevation, the conventional pen nib enclosing cap ordinarily cooperative with the pen barrel being omitted; Fig. 2 is a fragmentary complete longitudinal vertical section of the structure shown in Fig. 1; Fig. 3 is a transverse section, taken on line 3—3 in Fig. 2; and Fig. 4 is a transverse section, taken on line 4—4 in Fig. 2. Fig. 5 is a fragmentary vertical longitudinal section, showing a modified arrangement of the pen structure.

Similar characters of reference are employed in the hereinabove described views, to indicate corresponding parts.

Referring to the drawing, the reference character 1 indicates the hollow barrel of the pen, the same being externally screw-threaded at its

lower end, as at 2, for attaching thereto a removable cap (not shown) adapted to enclose the pen nib when the pen is not in use. The barrel 1 is open at its lower end and closed at its upper end. The lower open end of the barrel is preferably internally screw threaded, as at 3, for a distance upwardly thereinto. Engaged within the lower end of the barrel is a fitting adapted to serve as an ink material holding means and a water conduit means leading from a water supply. This fitting comprises a plug 4 which is externally screw-threaded to engage in the internally screw-threaded lower end of the barrel 1. Integral with the plug 4, and projecting axially upward from the upper side thereof is a neck 5 of reduced diameter, said neck having an upwardly open chamber or bore 6. Also integral with the plug 4, and projecting axially downward from the under side thereof is a tubular extension 7 of reduced diameter, the same having a downwardly open chamber or bore 8, the inner end of which terminates at or within the plug body 4; said chamber or bore providing a storage compartment for soluble ink material 9. The lower open end of said tubular extension 7 is provided with a chamfered or sharpened peripheral edge 10. Engaged over the neck 5 of the fitting is the open lower end of a resilient sac 11, which is thus coupled to the neck in communication with the chamber or bore 6 thereof. The sac 11 provides a water container or reservoir. When the plug 4 of the fitting is screwed in place within the lower end of the barrel 1, the tubular extension 7 is positioned within the lower interior of the barrel, the walls of the latter being concentric thereto, thus providing an annular mixing chamber 12 surrounding the ink holding extension. Formed in the side walls of said tubular extension 7 are a plurality of openings or ports 13 affording communication between the interior of the same and the interior of said mixing chamber 12. Formed in and extending obliquely through the body of the plug 4 are a plurality of ducts 14 leading from the chamber or bore 6 of the neck 5 to the interior of said mixing chamber 12, whereby water may flow from and to the reservoir sac 11.

The reference character 15 indicates the removable throat section of the pen, the same having an externally screw-threaded butt portion 16 to fit and screw into the internally threaded lower end of the barrel 1 below the above described fitting, to thus detachably assemble said throat section to the barrel. Said throat section is provided with an axial bore 17

extending longitudinally therethrough, and engaged in and through this bore is a feed bar 18. A pen nib 19 is associated with said feed bar and also inserted in the throat section to project outwardly therefrom. The feed bar is provided with a longitudinally extending channel or duct 20 leading downwardly from its upper end, where it communicates with the mixing chamber 12, to the back of the pen nib 19.

In the arrangement of the above described structure as shown in Figs. 1 and 2, the fitting is so disposed or positioned within the barrel 1, that the lower open end of the tubular extension 7, which holds the soluble ink material, will be abutted and closed by the end of the feed bar 18 when the throat section 15 is operatively connected with the barrel 1. The provision of the sharpened edge 10 at the lower end of the tubular extension 7 will bite against the end of the feed bar 18, thereby assuring a tight closure of the lower end of the ink material holding chamber. This arrangement is of advantage under circumstances wherein it is desired to refill the holding chamber with ink material, in which case it is merely necessary to invert the pen and then remove the throat section, thus exposing the open end of said chamber so that a stick or bar of solid or other form of soluble ink material may be readily inserted therein. While threaded connections are shown for attaching both the fitting and the throat section in operative assembled relation to the pen barrel, it will be obvious that either one or the other or both of these parts may be connected by merely tight sliding fit; or, on the other hand the fitting may be fixed to the barrel by cement or any other desired means. It is deemed preferable, however, that the fitting be removably attached, since such arrangement is more convenient when it is desired to replace a water sac, or in the event it is desired to provide ink filled fittings for replacement of ink exhausted fittings.

When the pen is charged with a supply of ink material, the sac 11 is supplied with water by any suitable self-filling means such as is commonly provided in fountain pens. It may here be mentioned, however, that the use of the sac 11 is not absolutely essential, since the interior of the barrel per se may constitute a water reservoir, and in such case any desired means for introducing water therinto may be utilized. In any event water being supplied the fitting and its ink holding means, the pen is ready for use. When the pen is downturned to writing position, water from the reservoir flows downwardly through the ducts 14 into the mixing chamber 12 which surrounds the tubular extension 7 holding the soluble ink material 9. The water thus delivered to the mixing chamber 12 makes contact with the ink material 9 through the openings or ports 13, whereby some of such material is dissolved and mingles with the water in said mixing chamber 12, thus staining the same and converting it into a colored writing fluid. The writing fluid thus formed passes downwardly out of the mixing chamber 12 through the channel or duct 20 of the feed bar 18, whereby the same is delivered to the pen nib 19, which is thereby served for writing operations therewith.

A further advantage of the novel soluble ink pen structure above described, lies in the fact that, when the pen is inverted, i. e. upturned to non-writing position in which it is normally carried in the pocket when not in use, the water within the mixing chamber 12 will immediately

drain back through the ducts 14 into the reservoir sac 11, and will thereby be removed from contact with the store of soluble ink material 9, and consequently the latter will be conserved against unduly rapid consumption, and the formation of unnecessarily concentrated, and consequently wasteful, writing fluid is avoided.

In Fig. 5 a somewhat modified arrangement of the elements of the pen structure is shown. In this modified arrangement the fitting constituting the water communication means and the means for holding the soluble ink material is set or fixed closer to the open end of the pen barrel 1, and the butt portion 16 of the throat-section 15 is counterbored to provide a chamber 12' into which the tubular extension 7 projects; said chamber 12' being of larger diameter than the tubular extension 7 so that an annular space constituting the mixing chamber is formed in the throat section butt portion in surrounding relation to said tubular extension. In other respects and in its mode of operation, this modified pen structure is the same as already above described.

I am aware that some changes could be made and somewhat different embodiments of this invention could be produced without departing from the scope thereof as defined in the claims appended hereto; consequently it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:—

1. In a fountain pen, a barrel interiorly arranged to provide a liquid reservoir, a transverse plug within the interior of said barrel below said reservoir, a chambered member of reduced diameter extending axially downward from said plug whereby an annular space to provide a mixing chamber surrounds said member, said member being adapted to hold a body of soluble ink material, a throat section having a pen nib and channeled feed bar, said throat section being connected with the lower end of said barrel below said plug and chambered member with said channeled feed bar in communication with said mixing chamber space, the side walls of said chambered member having means affording communication between the interior thereof and said mixing chamber space, and said plug having means of communication between said liquid reservoir and said mixing chamber space.

2. In a fountain pen, a barrel open at its lower end, a transverse plug within the interior of said barrel adjacent to its open end, a neck of reduced diameter extending upwardly from said plug, a resilient water reservoir sac coupled by said neck to said plug, a tubular extension of reduced diameter extending downwardly from said plug whereby an annular space to provide a mixing chamber surrounds said extension, the interior of said extension being adapted to hold a body of soluble ink material, a throat section having a pen nib and a channeled feed bar, said throat section being connected with the lower end of said barrel below said plug with the channeled feed bar in communication with said mixing chamber space, the side walls of said extension having ports affording communication between the interior thereof and said mixing chamber space, said neck having a central opening communicating with the interior of said sac, and said plug having ducts extending between

said neck opening and said mixing chamber space.

3. In a fountain pen, a barrel arranged to provide a liquid reservoir, a transverse plug within the interior of said barrel below said reservoir, a tubular extension of reduced diameter extending downwardly from said plug whereby an annular space to provide a mixing chamber surrounds said extension, said extension providing an interior ink material storage chamber open at its lower end and having its upper end terminating at said plug, a throat section connected with the lower end of said barrel, a pen nib at the free end of said throat section, a channeled

feed bar extending through said throat section, the upper end of said feed bar serving to close the lower end of said ink material storage chamber when said throat section is operatively attached to said barrel, the channel of said feed bar communicating with said mixing chamber space, the side walls of said extension having ports affording communication between the interior thereof and said mixing chamber space, and said plug having means of communication between said liquid reservoir and said mixing chamber space.

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