

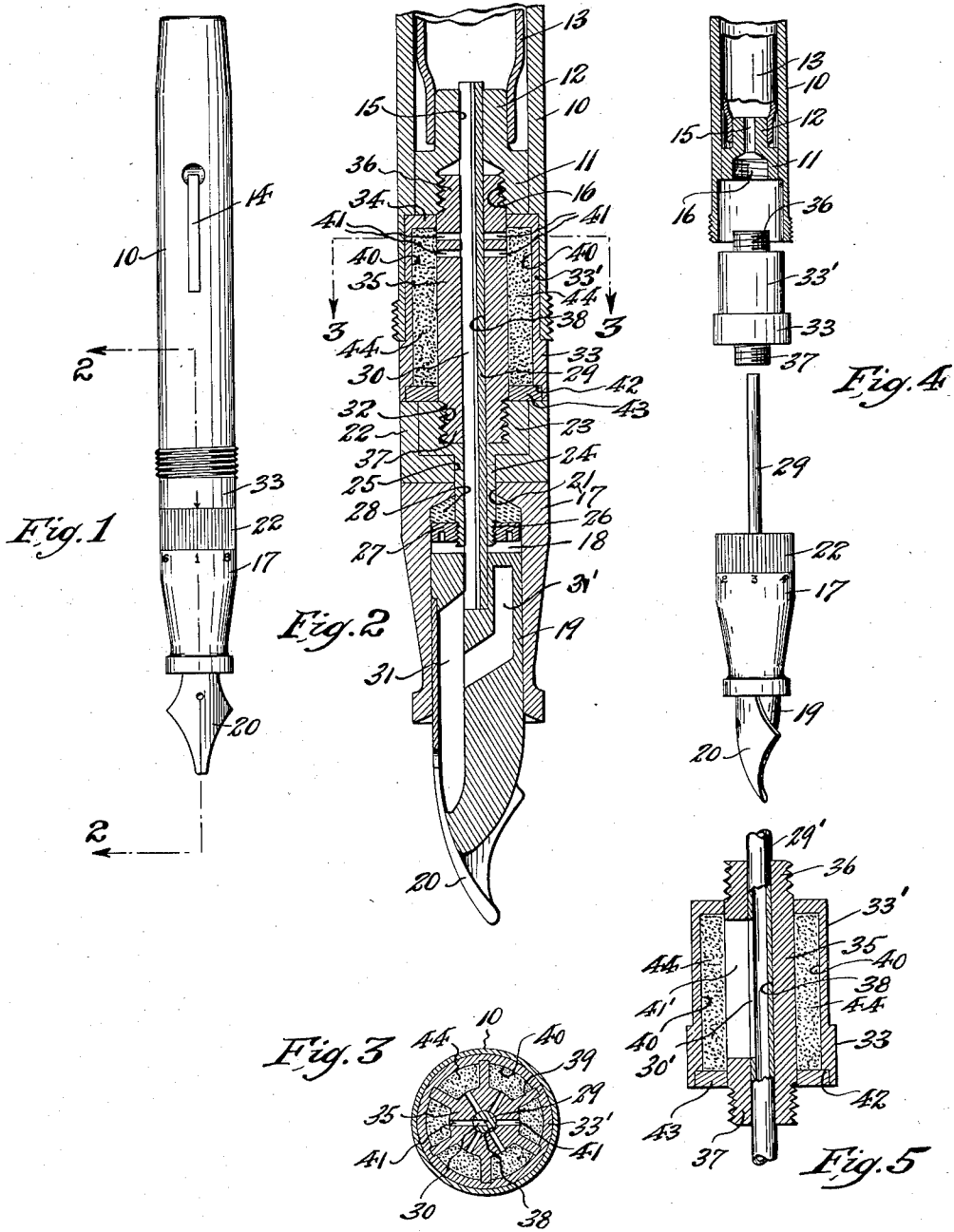
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SOLUBLE INK FOUNTAIN PEN

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SOLUBLE INK FOUNTAIN PEN

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7 Claims. (Cl. 120—42)

This invention relates to improvements in fountain pens of the kind in which the writing fluid is produced by flowing a solvent, such as water, in contact with initially dry but soluble ink material, the resultant writing fluid being thereupon delivered to the pen nib; the present invention having reference to further improvements in soluble ink fountain pens of the general type disclosed in prior United States Letters Patent No. 1,912,774, dated June 6, 1933 and in a pending application for United States Letters Patent Ser. No. 710,450, filed February 9th, 1934, wherein a plurality of individual ink masses are arranged to be successively available.

The present invention has for its principal object to provide an improved arrangement wherein the ink material magazine is detachably connected with the pen structure, subject to removal and replacement; the means for coupling or securing the magazine in operative relation to the pen structure being such that fluid tight joints are assured when the parts are operatively assembled.

This invention has for a further object to provide a novel pen structure wherein the ink material magazine, when operatively assembled therein, is securely held in a stationary position or relation to the pen barrel, and a novel means is provided for rotatably connecting with these parts a pen nib carrying throat member and solvent feed means whereby the latter may be quickly, easily and selectively brought into connection with the several individual masses of ink material stored in the magazine.

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

An illustrative embodiment of this invention is shown in the accompanying drawing, in which:—

Fig. 1 is an elevational view of a soluble ink fountain pen according to this invention, the closure cap being omitted; Fig. 2 is a fragmentary longitudinal vertical section, taken on line 2—2 in Fig. 1, but drawn on an enlarged scale; Fig. 3 is a transverse section through the ink material magazine and solvent feed means, taken on line 3—3 in Fig. 2; and Fig. 4 is a view in part side elevation and in part section, illustrating the manner of disassembling the pen structure for the purpose of removing the ink material magazine for recharging or replacement.

Fig. 5 is a fragmentary vertical section through the ink material magazine, showing a modified

form and arrangement of solvent feed member in connection therewith.

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

Referring to the drawing, the reference character 10 indicates the main body or barrel of the pen. Within the lower open end of said body or barrel 10 is disposed a plug 11 which is suitably affixed in place and which is provided at its upper or inner end with a spud 12 of reduced diameter, over which is engaged the mouth of a sac 13 which serves as a reservoir for a supply of water or other suitable solvent. The sac 13 extends upwardly within the interior of the barrel or body 10. The sac 13 consists in a flexible rubber body capable of being collapsed and expanded for filling operations, by suitable means actuable from the exterior of the barrel or body 10 in the manner familiar to the art, as e. g. by means of a manipulatable filling lever 14 (see Fig. 1). It will be obvious that the collapsible and expandible sac 13 is illustrative of one of several common forms of reservoir means, and consequently, in its broader aspects, the present invention is not to be considered as limited to the use thereof, since any other type of reservoir and filling means therefor, familiar to the art, may be employed in place thereof. Said plug 11 and its spud 12 is provided with an axial bore 15 to receive and closely fit a feed member to be subsequently described, whereby said feed member operatively communicates with the interior of the sac 13 and the solvent therein contained. At its lower or outer end, said plug 11 is provided with an axial internally threaded socket 16 of enlarged diameter as compared with the diameter of said bore 15.

The reference character 17 indicates the throat member of the fountain pen, the lower end of which is suitably bored to provide a chamber 18 to receive and immovably hold a feed bar 19 and associated pen nib 20. The upper end of said throat member 17 is provided with an opening 21 aligned with and communicating with the upper end of said chamber 18, said opening being of smaller diameter than the diameter of the chamber 18. Connected with the upper end of said throat member 17 is a coupler housing 22, which is counterbored to receive the head 23 of a coupler member, said coupler member being suitably rigidly or immovably secured to said housing. Dependent from the head 22 of said coupler member is a shank 24 of reduced diameter, which extends through an opening 25 in the

bottom of the housing 22 sized to fit the same. The coupler member may be made of metal and the housing 22 of material corresponding to that of the barrel 10 and throat member 17. If desired, however, the coupler member and housing may be made in one-piece instead of the two-piece form as shown. The lower end of the shank 24 is inserted downwardly through the top opening 21 of said throat member 17, and thus into the upper end of the chamber 18 of the latter. Said lower end of said shank 24 is externally threaded, as at 26, to receive a suitable nut 27 adapted to engage and compress a packing material 28 disposed in the upper end of said chamber 18 around said shank 24. By this arrangement the throat member is secured in connected relation to the coupling member while yet being free to turn thereon about its longitudinal axis. Said coupling member, constituted by the head 23 and shank 24, is provided with an axial bore 28 to receive and closely fit a feed member. The feed member comprises a cylindrical rod 29 provided throughout its length with a laterally open feed channel or duct 30. This feed member is immovably affixed to or footed in the upper end portion of the feed bar 19 so as to extend axially thereof upwardly through the bore 28 of the coupling member for upward projection beyond the latter. Said feed bar 19 is provided with a channel or duct 31 which communicates with the channel or duct of the feed member, and which leads from the latter to pen nib 20 for the delivery of writing fluid to the latter as will subsequently be made plain. At its upper or outer end said coupling member head 23 is provided with an axial internally threaded socket 32 of enlarged diameter and concentric to the feed member 29.

The reference character 33 indicates the ink material magazine, the same comprising a cylindrical shell having an upper portion 33' of reduced external diameter to fit into the barrel or body 10 below the plug 11, as shown. Preferably the shell is closed at one end, e. g. its upper end, by an integral end wall 34, and is open at its opposite end. Extending centrally through the shell 33 is a hub sleeve 35 of a length exceeding the length of the shell, whereby the exteriorly projecting ends thereof respectively provide, at the respective ends of the shell 33, externally screw threaded stubs 36 and 37. Extending axially through said hub portion 35 is a bore 38 to receive and closely fit the feed member 29. Extending longitudinally along the intermediate portion of said hub sleeve 35, as integral parts thereof and in circumferentially spaced radial projection therefrom, are a plurality of partition members 39 which abut the outer wall of said magazine shell 33, thus dividing the interior of the shell into a plurality of ink material storage chambers or compartments 40 radial to said hub sleeve 35. Formed in the wall of said hub sleeve 35 to provide communication between each chamber or compartment 40 are one or more ports 41. Preferably these ports 41 are located to communicate with the upper end portions of the chambers or compartments 40 when the pen is disposed in writing position. Said chambers or compartments are open at their lower ends, and the shell 33 is provided at its lower open end with a countersunk seat 42 to receive a closure washer or disk 43, which, when in place, serves to close the lower open ends of said chambers or compartments 40. The chambers or compartments 40 are each charged or packed with a

body 44 of suitable soluble ink material. This ink material may be provided in any suitable form, such e. g. as in stick form, or in the form of either a powder or a paste.

To assemble the magazine 33 in operative relation to and between the barrel or body 10 and the throat member 17 and its coupling member, the reduced end portion 33' of the magazine is inserted in the end of the barrel or body 10 and the stub 36 is aligned with the socket 16, whereupon by turning the magazine said stub 36 is screwed tightly and securely home in coupled relation to the plug 11, and thereby said magazine is affixed in operative relation to the barrel 10 and the solvent reservoir 13 contained therein. The feed member 29 carried by the throat member 17 is now aligned with the bore 38 of the magazine hub sleeve 35 and is pushed upwardly therethrough, with its upper end entered in the bore 15 of the plug 11, whereby, at the same time the socket 32 of the coupling member 23 is aligned with the magazine stub 37, so that by turning the coupling member, the same is screwed tightly and securely home in coupled relation to the lower end of the magazine, whereby the latter is affixed in operative relation to the throat member 17. When the parts are thus operatively assembled, it will be obvious that the barrel 10, magazine 33, and coupling member 23 will all be immovably affixed one to the other, while the throat member 17, and feed member 29 carried thereby, may be rotated about a longitudinal axis relative to the former parts, so that the throat member 17 turns about the shank 24 of the coupling member, while the feed member 29 turns in the bore 38 of the magazine hub-sleeve 35. It will also be obvious that the described connected arrangement of the barrel, magazine and throat member interlocks these parts together against accidental separation during use of the pen.

When the pen parts are operatively assembled together in the manner described, the feed member 29 may be turned in the bore 38 of the magazine hub-sleeve 35 to align its feed channel 30 with the port or ports 41 of any given ink material chamber or compartment of the magazine. In order to assist the user in readily and quickly ascertaining the operative position of the feed member 29 relative to a given ink chamber or compartment of the magazine, the outer surface of the throat member may be provided with positioning marks or indicia corresponding in number and circumferential spacing to the number and spacing of the magazine ink chambers or compartments, which marks or indicia can be opposed, by turning of the throat member 17, to a register mark carried by the magazine to indicate the operative aligning position of the feed member channel 30 with the port or ports 41 of the selected chamber or compartment with which the feed member is desired to be brought in operative relation.

In the operation of the pen, after the feed member has been aligned with a given ink material chamber or compartment of the magazine, water or other solvent from the reservoir sac 13 will flow downwardly through the feed channel 30 and will pass through the cooperating port or ports 41 into contact with the ink material 44. Portions of the ink material will dissolve and go into solution in the water or solvent, thus producing a writing fluid which will flow on down the feed channel 30 to the feed bar duct 41, whereby the writing fluid will be delivered to the pen

nib 20 in service relation thereto for carrying on writing operations.

When the pen is capped and reversed to upturned position, for carrying in the pocket in the usual manner, the solvent or water will flow back into the sac 13 and will drain out of the ink material chamber or pocket through the ports 41.

It will be obvious that after the ink material is exhausted from one chamber or compartment of the magazine, the feed member 29 may be turned to register its feed channel 30 with another compartment or chamber, and so on until the entire supply of ink material has been exhausted and the magazine is empty.

The empty magazine may be removed from the pen and recharged with ink material, or replaced with a new filled magazine. This is accomplished by unscrewing the coupling member 23 from the lower end of the magazine to permit the detachment of the throat member 17 therefrom and the withdrawal therefrom of the feed member which is carried by said throat member; whereupon the magazine, in turn, may be unscrewed from the barrel plug 11 and thus detached from the barrel 10 for refilling or replacement. The refilled or a new magazine is then reassembled in the pen assembly in the manner already above described, whereupon the pen is again ready for use.

While the feed member has been shown in the form of a channeled cylindrical bar, as above described, it will be obvious that the same may be of other forms. For example, as shown in Fig. 5, the feed member may be made in the form of a tube 29', having in the wall thereof a slot 30', and the hub-sleeve 35 of the magazine may be equipped with elongated slot-like ports 41' (as shown in Fig. 5) to cooperate with the communication slot 30' of such form of feed member, or said slot 30' may be arranged to communicate with the port or ports 41 of the magazine as heretofore described. It will also be noted that the feed bar 19 may be provided with a reservoir pocket 31' communicating with its duct 31, so that when the pen is upturned to carrying position a priming charge of writing fluid may be trapped therein ready for immediate delivery to the pen nib when next using the pen for writing.

Other changes than those indicated could be made in the various constructions and many apparently different embodiments of this invention could be made without departing from the scope of this invention as defined by the following claims; it is therefore 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 soluble ink fountain pen, a barrel arranged to provide a solvent reservoir, a throat member carrying a pen nib and feed bar therefor, a magazine having a plurality of separate ink material storage chambers, means to affix said magazine to said barrel means to rotatably couple said throat member to said magazine, and a feed member rotatable with said throat member and adapted to extend through said magazine in intercommunicating relation between said solvent reservoir and said feed bar, said feed member having lateral means of communication with said magazine whereby rotation of said feed member operates to selectively position the same in communication with said ink material storage members of the magazine.

2. In a soluble ink fountain pen, a barrel ar-

ranged to provide a solvent reservoir, a throat member carrying a pen nib and feed bar therefor, a magazine having a plurality of separate ink material storage chambers, means to detachably affix said magazine to said barrel, means to detachably but rotatably couple said throat members to said magazine, a feed member affixed to the feed bar of said throat member so as to turn with the latter, said feed member extending axially through said magazine into communication with said solvent reservoir, and said feed member having lateral means of communication adapted to be selectively positioned in communication with the ink storage chambers of said magazine when said feed member is turned by rotation of said throat member relative to said magazine.

3. In a soluble ink fountain pen, a barrel arranged to provide a solvent reservoir, a closure plug in the lower end of said barrel having an internally threaded socket, a magazine having a plurality of separate ink material storage chambers, a threaded stub at one end of said magazine to screw into said socket to thereby detachably affix said magazine to said barrel, a throat member carrying a pen nib and feed bar therefor, a coupling means with which said throat member is rotatably connected, said coupling means having an internally threaded socket, a threaded stub at the opposite end of said magazine to screw into said coupling means socket to thereby detachably affix said coupling means to said magazine, a feed member affixed to the feed bar of said throat member so as to turn with the latter, said feed member extending axially through said coupling means and magazine into communication with said solvent reservoir, and said feed member having lateral means of communication adapted to be selectively positioned in communication with the ink storage chambers of said magazine when said feed member is turned by relation of said throat member relative to said magazine.

4. In a soluble ink fountain pen, a barrel arranged to provide a solvent reservoir, a closure plug in the lower end of said barrel having an internally threaded socket, a magazine having a plurality of separate ink material storage chambers, a threaded stub at one end of said magazine to screw into said socket to thereby detachably affix said magazine to said barrel, a throat member carrying a pen nib and feed bar therefor, a coupling means with which said throat member is rotatably connected, said coupling means having a shank entered in the upper end of said throat member, packing material in said upper end of the throat member around said shank, a keeper nut threaded on said shank to hold said packing material, said coupling means having an internally threaded socket, a threaded stub at the opposite end of said magazine to screw into said coupling means socket to thereby detachably affix said coupling means to said magazine, a feed member affixed to the feed bar of said throat member so as to turn with the latter, said feed member extending axially through said coupling means and magazine into communication with said solvent reservoir, and said feed member having lateral means of communication adapted to be selectively positioned in communication with any one of said ink material storage chambers of said magazine when said feed member is turned by rotation of said throat member relative to said magazine.

5. In a soluble ink fountain pen, a barrel arranged to provide a solvent reservoir, a throat

member carrying a pen nib and a feed bar there-
 for, a magazine having an axial hub sleeve and
 radial circumferentially spaced partitions to sub-
 divide its interior into a plurality of separate
 5 ink storage chambers, said hub sleeve having lateral
 passages between the several chambers and
 the bore of said sleeve, means to detachably affix
 said barrel to one end of said magazine, means
 10 to detachably but rotatably couple said throat
 member to the other end of said magazine, a feed
 member rotatable with said throat member and
 adapted to extend through the bore of said maga-
 zine hub sleeve in intercommunication between
 15 said solvent reservoir and said feed bar, said feed
 member having lateral means of communication
 adapted to be selectively positioned in registra-
 tion with any of the passages leading to the ink
 material storage chambers of said magazine when
 20 said feed member is turned by rotation of said
 throat member.

6. In a soluble ink fountain pen, a barrel ar-
 ranged to provide a solvent reservoir, a throat
 member carrying a pen nib and a feed bar there-
 for, a magazine having an axial hub sleeve and
 25 radial circumferentially spaced partitions to sub-
 divide its interior into a plurality of separate ink
 storage chambers, said hub sleeve having lateral
 passages between the several chambers and the
 bore of said sleeve, said hub sleeve having thread-
 30 ed end portions projecting from the ends of the
 magazine, a closure plug in the lower end of said
 barrel having an internally threaded socket into
 which a threaded end portion of said hub sleeve
 screws to detachably affix said barrel to one end
 35 of said magazine, a coupling means with which
 said throat member is rotatably connected, said
 coupling means having an internally threaded
 socket into which the other threaded end portion
 of said hub sleeve screws to detachably affix said
 40 coupling means to the other end of said magazine,
 a feed member rotatable with said throat mem-
 ber and adapted to extend through the bore of
 said magazine hub sleeve in intercommunication

between said solvent reservoir and said feed bar,
 said feed member having lateral means of com-
 munication adapted to be selectively positioned
 in registration with any one of the passages lead-
 80 ing to the ink material storage chambers of said
 magazine when said feed member is turned by
 rotation of said throat member.

7. In a soluble ink fountain pen, a barrel ar-
 ranged to provide a solvent reservoir, a throat
 member carrying a pen nib and a feed bar there-
 85 for, a magazine having an axial hub sleeve and
 radial circumferentially spaced partitions to sub-
 divide its interior into a plurality of separate
 ink storage chambers, said hub sleeve having lat-
 eral passages between the several chambers and
 90 the bore of said sleeve, said hub sleeve having
 threaded end portions projecting from the ends
 of the magazine, a closure plug in the lower end
 of said barrel having an internally threaded
 95 socket into which a threaded end portion of said
 hub sleeve screws to detachably affix said barrel
 to one end of said magazine, a coupling means
 having a shank entered in the upper end of said
 throat member whereby said throat member is
 100 rotatably connected to said coupling means, pack-
 ing material in the upper end of said throat mem-
 ber around said shank, a keeper nut to hold said
 packing material, said coupling means having
 an internally threaded socket into which the
 105 other threaded end portion of said hub sleeve
 screws to detachably affix said coupling means
 to the other end of said magazine, a feed mem-
 ber rotatable with said throat member and adapt-
 ed to extend through the bore of said magazine
 hub sleeve in intercommunication between said
 110 solvent reservoir and said feed bar, said feed
 member having lateral means of communication
 adapted to be selectively positioned in registra-
 tion with any one of said passages leading to the
 ink material storage chambers of said magazine
 115 when said feed member is turned by rotation of
 said throat member.

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