Oct. 30, 1934. R. B. KINGMAN ET AL 1,978,675

SOLUBLE INK FOUNTAIN PEN

Filed Feb. 9, 1934

Fig. 1

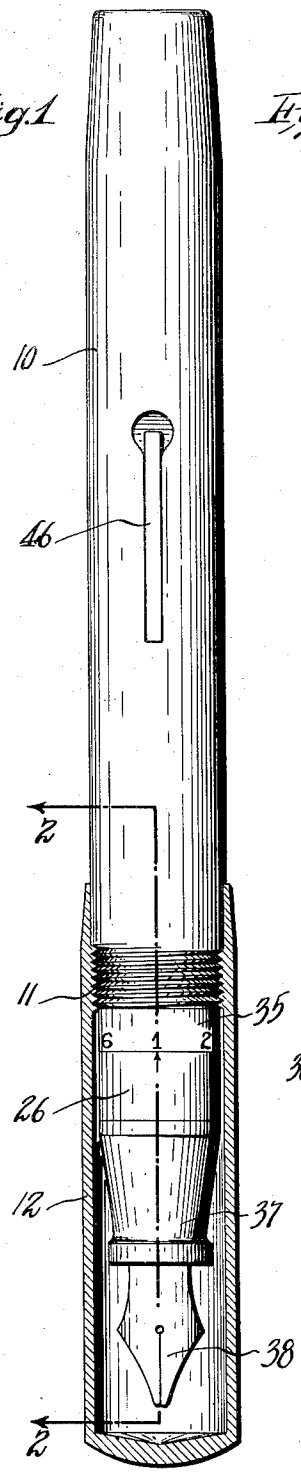


Fig. 2

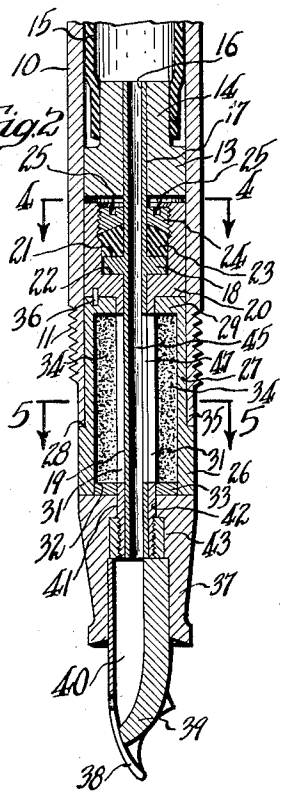


Fig. 3

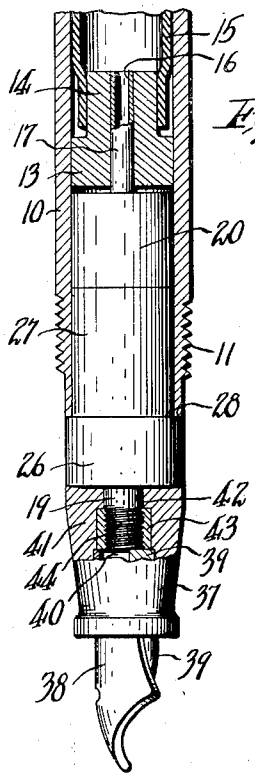


Fig. 5

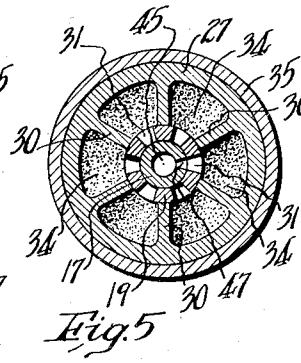
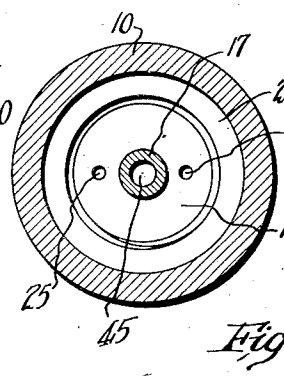


Fig. 4



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SOLUBLE INK FOUNTAIN PEN

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11 Claims. (Cl. 120—42)

This invention relates to improvements in that class of fountain pens in which the writing fluid is formed by flowing a solvent, such as water, in contact with an initially dry but soluble ink material, the resultant writing fluid being thereupon supplied to the pen nib; and this invention has reference, more particularly, to improvements in fountain pens of this type of the general kind described in prior United States Letters Patent No. 1,912,774, dated June 6, 1933, wherein a plurality of individual ink masses are arranged to be successively available until the entire available quantity of ink is exhausted by use.

This invention has for its principal object to provide an improved arrangement of ink carrying means in combination with a solvent feed means capable of being selectively disposed in operative relation thereto, so as to successively expose different individual bodies of ink material subject to contact with a solvent whereby the several masses of ink material are adapted to be successively used in the formation of writing fluid for delivery to the pen nib.

With this object in view, the invention comprises a stationary ink material magazine relative to which a solvent feed means is movably arranged for communication with the different ink masses with which the magazine is charged; the arrangement being such that not only is the mechanical construction of the pen simplified, and its manipulation more readily accomplished, but all risk of leakage of either the solvent per se or the writing fluid formed by union of the solvent and ink material to the exterior surface of the pen barrel or holder, with resultant staining of the user's fingers, is eliminated.

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 the 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 removal cap thereof being shown in normal closed relation thereto and in longitudinal section; Fig. 2 is a fragmentary longitudinal vertical section with the cap removed, said section being taken on line 2—2 in Fig. 1; Fig. 3 is a similar longitudinal vertical section, with certain parts shown in elevation; Fig. 4 is a transverse section, taken on line 4—4 in Fig. 2, but drawn on an enlarged scale; and Fig. 5 is another transverse section, taken on line 5—5 in Fig. 2 and also drawn on an enlarged scale.

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, the same being externally screw-threaded, as at 11, adjacent to its lower end, for the reception of the removal cap 12 which is adapted to enclose the pen nib when the pen is not in use. Fixed within the body or barrel 10, in a position spaced upwardly from the open lower end thereof, is a plug 13 having at its upper end a projecting spud 14 of reduced diameter, over which is engaged the mouth of a sac 15 to contain water or any other suitable solvent. Said sac extends upwardly within the barrel interior. Said plug 13 is securely and immovably affixed to the barrel walls in any suitable manner. Said plug 13, with its spud 14, is provided with an axial bore 16 in which is fitted and immovably secured, by any suitable means, the upper end of a solvent feed tube 17, so that the latter communicates with the interior of the sac 15. Said feed tube 17 is provided, at a point spaced below said plug 13, with an external annular stop flange 18. Telescopically engaged over the lower end portion of said feed tube 17 is a sleeve 19, having at its upper end a diametrically enlarged head 20 provided with a countersunk upwardly open chamber 21 the bottom of which forms an internal shoulder 22 adapted to abut the stop-flange 18, when the latter is received within said chamber 21. A suitable packing material 23 is entered within the chamber 21 and engaged over the stop flange 18 and around the adjacent portion of the feed tube 17; the packing being compressed and held in place by a gland 24 which is threaded into the internally threaded open end of the chamber 21. Said gland is provided with spanner wrench sockets 25 for manipulating the same. The packing 23 produces a tight joint between the upper end of the sleeve 19 and the feed tube 17, and also a frictional grip of the former upon the latter, whereby the tube 17 while capable of being turned relative to the sleeve 19, will not be likely to be accidentally displaced from any given adjusted relation to the latter to which it may have been manually turned.

The reference character 26 indicates a hollow ink material magazine, the same comprising a cylindrical shell having an upper portion 27 of reduced external diameter to provide a shoulder 28. The upper end of the magazine is closed by an integral end wall 29. The magazine is further provided with a central or axial bore to

receive the sleeve 19 over which the magazine is to be engaged. The interior of the magazine is subdivided into a plurality of ink material holding compartments or pockets by radial walls or partitions 30 which project inwardly from the external side walls thereof to converge upon and abut the sides of the sleeve 19; the compartments or pockets being open toward the latter. The walls of said sleeve 19 are provided with a plurality of longitudinal slots or openings 31 corresponding in number with the number of compartments or pockets with which the magazine is provided; said slots or openings being respectively aligned with the respective magazine compartments or pockets. At its lower open end, the magazine is provided with a countersunk seat 32 to receive a closure washer or disc 33 to close the lower ends of the compartments or pockets. Said compartments or pockets are each charged or packed with a body 34 of suitable soluble ink material. This ink material may be provided in any well-known form, such e. g. as of stick form, or in the form of a powder or paste. After the compartments or pockets are charged with the ink material, the closure washer or disc 33 is engaged in the seat 32 to close the lower ends of the charged compartments or pockets. The ink charged magazine is slid over the lower end of the sleeve 19 and pushed upwardly thereon so that its upper reduced end portion 27 is entered in the lower open end of the barrel 10, until the margin of the skirt 35 of the latter is engaged by the shoulder 28, and the upper end of the magazine abutted against the underside of the head 20 of said sleeve 19. Said sleeve head 20 is provided with a depending positioning pin 36 which enters an opening in the upper end wall 29 of the magazine, thus positioning the latter so that its ink charged compartments or pockets are respectively aligned with the respective slots or openings 31 of the sleeve 19.

The reference character 37 indicates the throat member of the fountain pen, the lower end of which is suitably bored to receive insertion of a pen nib 38 and a feed bar 39; the latter having a channel or passage 40 open to the inner side of the pen nib to convey writing fluid to the latter. At its upper end the throat member is closed by an end wall 41 having a central opening 42 to receive the lower end of said sleeve 19. Imbedded in the throat member, intermediate said opening 42 and the feed bar 39, is an internally screw-threaded nut-member 43 which is immovably affixed to said throat member. The lower end portion of said sleeve 19 is externally-screw-threaded, as at 44, for engagement by said nut-member 43. After the ink-charged magazine is assembled on the sleeve 19 and inserted into the lower end of the barrel 10, the throat member 37 is screwed home onto the end of said sleeve, thereby securing in operative assembled relation the various parts of the pen, and at the same time coupling the upper end of the feed bar passage 40 in communicating alignment with the passage 45 of the feed tube 17 which communicates at its upper end with the interior of the sac 15. The sac 15 is compressible by means of the usual filling lever means 46, or any other manipulatable filling device, accessible at the exterior of the barrel 10, whereby, when the throat member 37 is dipped in water or other solvent, and the air driven out of the sac 15 by compression, the water or solvent will be forced by atmospheric pressure upwardly through the pen-nib, feed bar passage and feed tube into the sac 15 so as to store a supply thereof within the latter. It will be obvious that the compressible sac 15 is merely illustrative of one of several usual types of water or solvent reservoir means, and consequently, in its broader aspects, this invention is not to be limited to such form of reservoir or pen filling means.

The feed tube 17 is provided in its side with a single port 47, so that by turning movement of the feed tube 17 relative to the sleeve 19 and associated ink material magazine, the feed tube passage 45 may be selectively brought into communication with the ink charged compartments or pockets of the magazine. Since the feed tube 17 is affixed or united to the barrel 10 by means of the plug 13, which is mutually secured to and between these parts, it follows that by turning the barrel 10 relative to the mutually interengaged and secured sleeve 19, magazine 26 and throat member 37, the feed tube 17 will be turned within the sleeve 19 so as to bring the feed tube port 47 into registration with any given slot or opening 31 of the sleeve 19, and consequently into communication with the corresponding ink-charged compartment or pocket of the magazine. In order to assist the user in readily and quickly ascertaining the operative position of the feed tube relative to a given ink compartment or pocket of the magazine, the outer surface of the magazine is provided with a register mark corresponding to the position of the feed tube port 47, and the skirt 35 of the barrel with positioning marks or indicia corresponding to the positions of the ink compartments or pockets of the magazine.

In the operation of the pen, after the feed tube port 47 has been aligned with a given ink charged compartment or pocket of the magazine, water or other solvent from the reservoir sac 15 will flow downwardly through the passage 45 of the feed tube 17, and will pass through the port 47 and aligned sleeve opening or slot 31 into contact with the ink material 34 of the operative magazine compartment or pocket. In thus contacting with the ink material the water or other solvent will dissolve portions thereof which will thus create a writing fluid which will flow back through the port 47 and downwardly through the lower end of the feed tube passage 45 and thence into the channel 40 of the feed bar 39, whereby the writing fluid is delivered to the pen nib 38 to charge the same for desired writing operation.

It will be obvious that after the ink material is exhausted from one compartment or pocket of the magazine, the feed tube may be turned so as to register its port 47 with another compartment or pocket of the magazine, 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 and removing the throat member 37 from the end of the sleeve 19, after which the magazine may be in turn slid off of the sleeve, and thereupon recharged, and then again replaced in operative assembled relation to the pen, and secured in such relation by replacing the throat member 37. It will be apparent that all of these operations are easily and quickly accomplished, and that when the parts are assembled they are all securely interrelated together in operative condition, and in such manner as to assure against any leakage of either solvent or writing fluid to the exterior surfaces of the pen above the pen nib.

As many changes could be made in the above described constructions and many apparently widely different embodiments of this invention could be made without departing from the scope thereof as defined in the following claims; 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.

We claim:—

1. In a soluble ink fountain pen, a barrel arranged to provide a solvent reservoir and having a feed tube leading therefrom, an ink material magazine having a plurality of separate pockets, said feed tube having a port adapted by relative movement of said feed tube and magazine to be selectively registered in communication with the ink charged pockets of the latter, a throat member carrying a pen nib and feed bar therefor, and means to retain said throat member and magazine in operative assembled relation to said barrel and feed tube.

2. In a soluble ink fountain pen, a barrel arranged to provide a solvent reservoir, a feed tube having its upper end communicating with said reservoir, means to affix said feed tube to said barrel in axial extension therefrom, a magazine having a plurality of centrally open separate ink material holding pockets, said feed tube extending centrally through said magazine, said barrel and feed tube being rotatably related to said magazine, said feed tube having a port selectively disposable in communication with the pockets of said magazine upon rotation of said barrel and feed tube relative to the latter, a throat member carrying a pen-nib and feed bar therefor, and means to retain said throat member and magazine in operative assembled relation to said barrel and feed tube.

3. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, said magazine being immovably related to said throat member, a barrel arranged to provide a solvent reservoir, said barrel being rotatably related to said magazine, a feed tube affixed to said barrel to extend through said magazine, said feed tube being adapted to communicate at one end with said reservoir and at the other with the feed bar of said throat member, said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered with any one of the chambers of said magazine.

4. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, a sleeve engaged axially through said magazine and threaded into said throat member, said sleeve having a head to engage and bind said magazine on said sleeve between said head and said throat member, said sleeve having openings through its sides corresponding to and communicating respectively with the respective magazine chambers, a barrel arranged to provide a solvent reservoir, a feed tube affixed to said barrel in axial relation thereto to extend through said sleeve in intercommunicating relation between said reservoir and the feed bar of said throat member, said barrel being rotatably related to said magazine, and said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered through the openings of said sleeve with any one of the chambers of said magazine.

5. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, a sleeve engaged axially through said magazine and threaded into said throat member, said sleeve having a head to engage and bind said magazine on said sleeve between said head and said throat member, said sleeve having openings through its sides corresponding to and communicating respectively with the respective magazine members, a barrel arranged to provide a solvent reservoir, a feed tube affixed to said barrel in axial relation thereto to extend through said sleeve in intercommunicating relation between said reservoir and the feed bar of said throat member, said barrel being rotatably related to said magazine, said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered through the openings of said sleeve with any one of the chambers of said magazine, said sleeve head having a chambered upper end, said feed tube having an annular stop flange seated in said chambered head, and means carried by said head to cooperate with said stop flange to prevent longitudinal displacement of said sleeve and associated parts relative to said feed tube.

6. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, a sleeve engaged axially through said magazine and threaded into said throat member, said sleeve having a head to engage and bind said magazine on said sleeve between said head and said throat member, said sleeve having openings through its sides corresponding to and communicating respectively with the respective magazine chambers, a barrel arranged to provide a solvent reservoir, a feed tube affixed to said barrel in axial relation thereto to extend through said sleeve in intercommunicating relation between said reservoir and the feed bar of said throat member, said barrel being rotatably related to said magazine, said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered through the openings of said sleeve with any one of the chambers of said magazine, said sleeve head having a chambered upper end, said feed tube having an annular stop flange seated in said chambered head, and means carried by said head to cooperate with said stop flange to prevent longitudinal displacement of said sleeve and associated parts relative to said feed tube, said latter means comprising a body of packing engaged around the feed tube within said chambered head and over said stop flange, and a gland member secured within said chambered head over said packing body.

7. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, a magazine having a plurality of inwardly open radially grouped pockets to contain soluble ink material, said magazine being disposed above and in fixed relation to said throat member, a barrel arranged to provide a solvent reservoir, an axially disposed feed bar affixed to said barrel in communication with said reservoir and adapted to extend downwardly through said magazine into communication with said feed bar, said barrel and feed tube being rotatably related to said mag-

azine, and said feed tube having a port in its side adapted by step by step rotative movement of said barrel and tube to be successively disposed in lateral communication with said magazine pockets.

8. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, a magazine having a plurality of inwardly open radially grouped pockets to contain soluble ink material, said magazine being disposed above and in fixed relation to said throat member, a barrel arranged to provide a solvent reservoir, an axially disposed feed bar affixed to said barrel in communication with said reservoir and adapted to extend downwardly through said magazine into communication with said feed bar, said barrel and feed tube being rotatably related to said magazine, and said feed tube having a port in its side adapted by step by step rotative movement of said barrel and tube to be successively disposed in lateral communication with said magazine pockets, and cooperative means on adjacent external surfaces of said barrel and magazine registrable to indicate the operative relation of said feed tube port to the respective magazine pockets.

9. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, a sleeve engaged axially through said magazine and threaded into said throat member, said sleeve having a head to engage and bind said magazine on said sleeve between said head and said throat member, said sleeve having openings through its sides corresponding to and communicating respectively with the respective magazine chambers, a barrel arranged to provide a solvent reservoir, a feed tube affixed to said barrel in axial relation thereto to extend through said sleeve in intercommunicating relation between said reservoir and the feed bar of said throat member, said barrel being rotatably related to said magazine, said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered through the openings of said sleeve with any one of the chambers of said magazine, and cooperative means on adjacent external surfaces of said barrel and magazine registrable to indicate the operative relation of said feed tube port to the respective magazine pockets.

10. In a soluble ink fountain pen, a throat member having a pen-nib and feed bar therefor, an ink material magazine having a series of chambers to contain soluble ink material, a sleeve engaged axially through said magazine and threaded into said throat member, said sleeve having a head to engage and bind said magazine on said sleeve between said head and said throat member, said sleeve having openings through its sides corresponding to and communicating respectively with the respective magazine chambers, a barrel arranged to provide a solvent reservoir, a feed tube affixed to said barrel in axial relation thereto to extend through said sleeve in intercommunicating relation between said reservoir and the feed bar of said throat member, said barrel being rotatably related to said magazine, said feed tube having a port adapted by turning of the tube with said barrel relative to said magazine to be selectively registered through the openings of said sleeve with any one of the chambers of said magazine, said sleeve head having a chambered upper end, said feed tube having an annular stop flange seated in said chambered head, and means carried by said head to cooperate with said stop flange to prevent longitudinal displacement of said sleeve and associated parts relative to said feed tube, said latter means comprising a body of packing engaged around the feed tube within said chambered head and over said stop flange, and a gland member secured within said chambered head over said packing body, and cooperative means on adjacent external surfaces of said barrel and magazine registrable to indicate the operative relation of said feed tube port to the respective magazine pockets.

11. 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, an ink material magazine between said barrel and throat member, said magazine having a plurality of separate ink material storage pockets, and a rotatable feed means extending through said magazine in intercommunicating relation between said solvent reservoir and the feed bar of said throat member, rotation of said feed means being operative to selectively position the passage thereof in communication with said ink material storage pockets of the magazine.

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