

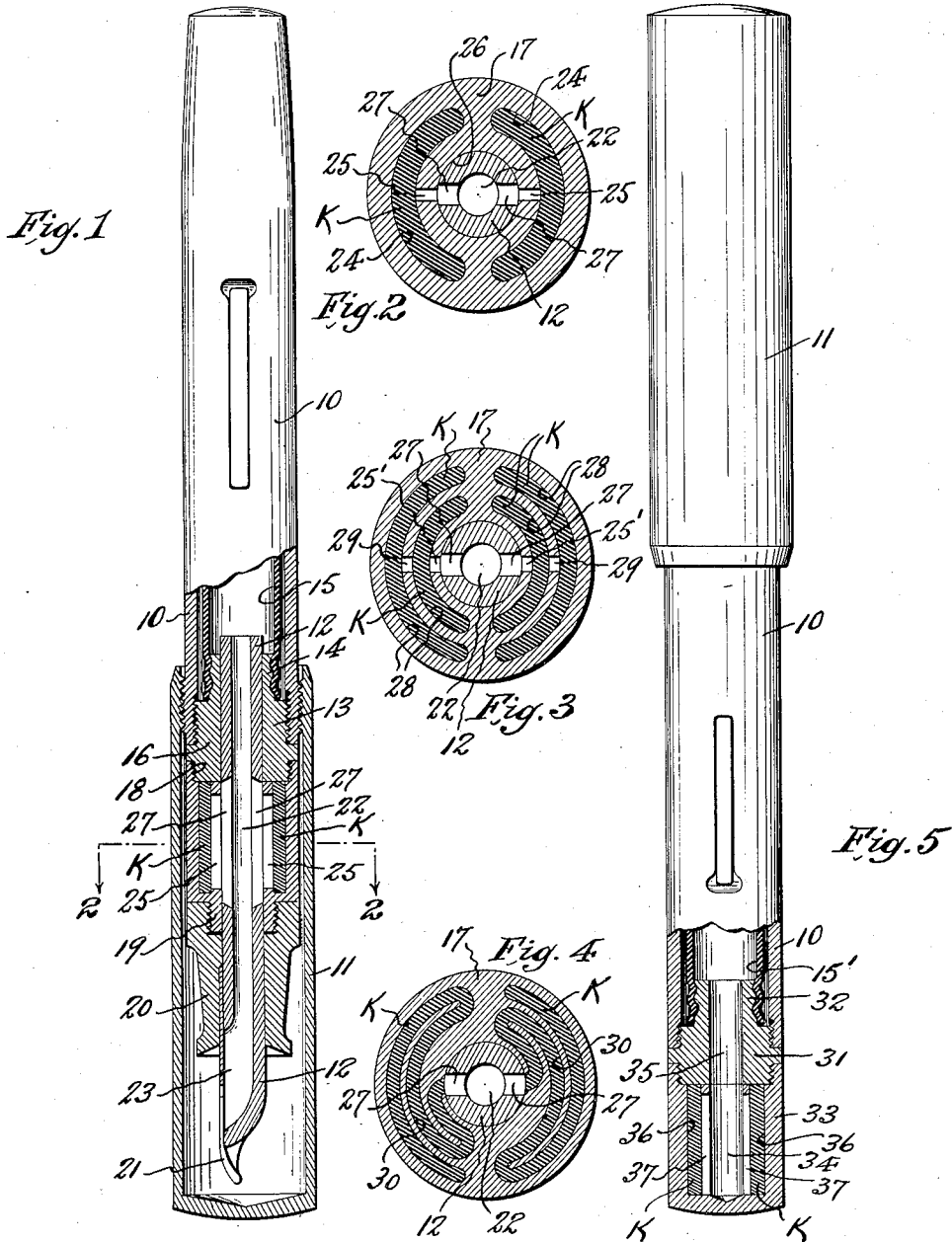
July 3, 1934.

R. B. KINGMAN

1,964,821

SOLUBLE INK FOUNTAIN PEN

Filed June 14, 1933



INVENTOR
Russell B. Kingman,
BY
George D. Richards,
ATTORNEY

UNITED STATES PATENT OFFICE

1,964,821

SOLUBLE INK FOUNTAIN PEN

Russell B. Kingman, Orange, N. J.

Application June 14, 1933, Serial No. 675,726

3 Claims. (Cl. 120—42)

This invention relates to improvements in that type of fountain pen in which the writing fluid is produced by flowing water in contact with a mass of initially dry but soluble ink material; the resultant writing fluid being thereupon delivered to the pen nib for service.

This invention has for its principal object to provide, in a fountain pen of the kind above mentioned, a novel means for carrying a considerable mass of soluble ink material to afford a quantity thereof sufficient to provide writing fluid over a very long period of time; this ink material being so related to a water supply means as to be subject, without necessity for manipulation of moveable devices or parts, to progressive contact with the water solvent until the ink material is gradually and finally consumed.

Another object of this invention is to provide a novel means for holding the supply of soluble ink material, which is readily detachable from the pen structure, so that, when the ink material is entirely consumed, the holding means may be removed and thrown away, and a new holding means containing a fresh supply of soluble ink material thereupon replaced therefor in operative connection with the pen structure.

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

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

Fig. 1 is in part a side elevation and in part a vertical longitudinal section showing a fountain pen equipped with the novel means for holding the dry soluble ink material subject to contact with the water solvent. Fig. 2 is a transverse section, drawn on an enlarged scale, showing one arrangement of the soluble ink material in the holding means therefor; Figs. 3 and 4 are respectively views similar to that of Fig. 2, but showing other arrangements of the soluble ink material in the holding means therefor; and Fig. 5 is in part a side elevation and in part a vertical longitudinal section showing a modified arrangement and location of the soluble ink holding means relative to the pen structure, and subject to contact with the water solvent with which the latter is supplied.

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

Referring to the drawing, the reference character 10 indicates the main body or barrel of a fountain pen, the same being usually externally screw threaded at its lower end to receive the removable nib enclosing cap 11. A feed bar 12 is connected at its upper end with the lower end of the barrel 10 by a coupling member 13. This

the lower end of said barrel 10, and is provided at its inner end with a neck-piece 14 to which is secured a water sac 15. At its lower end, said coupling member is provided with an externally threaded boss 16 of reduced diameter. Mounted over the downwardly projecting feed bar 12 is an ink holder, which preferably comprises a cylindrical casing 17, having at its upper end an internally threaded socket 18 to engage and connect the same to said boss 16 of said coupling member 13. At its lower end said casing 17 is provided with an externally threaded neck 19. Threaded upon said neck 19 is a throat member 20 which engages over the lower end of said feed bar 12, and which serves to hold a pen nib 21 in operative relation to the lower free end of said feed bar.

The feed bar 12 is provided with an axial duct 22 communicating at its upper end with the interior of said water sac 15, and at its lower end having a discharge mouth 23 contiguous to the inner face of the pen nib 21.

The ink holder casing is provided with one or more cavities more or less concentric to the feed bar, into which cavities is packed the mass of soluble ink material K. These cavities are of such form that the same will hold a plate or plates of compressed dry ink, or bodies of ink powder, of such mass or volume as to provide a supply thereof sufficient to last for a very long period of pen use before entirely consumed. The cavities may be of various cross-sectional forms, some examples of which are shown in Figs. 2 to 4 inclusive. For example, as shown in Fig. 2, the cavities 24 comprise single chambers of arcuate shape on opposite sides of the feed bar 12 and substantially concentric to the latter, the same being closed at their bottom ends, but preferably open at their upper ends for the introduction of the soluble ink material thereinto. Leading from the inner sides of said cavities or chambers 24 are openings or slots 25, the same being open at the surface of the axial bore 26 through which passes the feed bar 12 when the ink holder casing is operatively assembled with the pen structure. Said openings or slots 25 communicate with lateral openings or ports 27, provided in the walls of the feed bar 12 to communicate with the duct 22 of the latter. It will be obvious that when the water, with which the sac 15 may be filled, flows downwardly through the duct 22 of the feed bar toward the pen nib 21, it will pass through the lateral openings or ports 27 and slots 25 into contact with the plates or bodies of soluble ink material K, whereupon such contact will gradually dissolve the latter so that an ink solution will be delivered beyond the ink holder casing to the pen nib from the discharge mouth 23 of the feed bar. Again the cavities may comprise,

as shown in Fig. 3, a plurality of spaced concentric chambers 28 interconnected by intercommunicating slots 29, and the inner chambers being in communication with the lateral openings or ports 27, and through these with the duct 22 of the feed bar 12. Another arrangement of the cavities is shown in Fig. 4, in which the same comprise one or more chambers 30 S-shaped in cross-section, with an end thereof in communication with the lateral openings or ports 27, and through these with the duct 22 of the feed bar 12. It will be obvious that the cavities or chambers adapted to hold the mass or masses of soluble ink material may be produced in various forms other than the particular illustrative forms above mentioned.

A marked advantage of the arrangement of soluble ink supply, as afforded under the principles of this invention, lies in the fact that the holder casings 17 are a separable and replaceable part of the pen structure, and may be supplied as a convenient refill unit containing a generous supply of soluble ink in initially dry form. When the ink material of the holder in use is exhausted, it is a simple matter to remove the throat member 20, detach the empty ink holder casing 17, and then replace the same with a full holder casing. It will be understood, in this connection that I do not limit myself to the particular form of connections above described for interengaging the holder casing between the pen barrel and the throat member 20, since the described forms of such connections are merely illustrative of one type of serviceable means for such purposes.

It will be obvious from an inspection of the drawing, and from the above description, that once the ink holder casing is attached in operative assembled relation to the pen structure, the contained ink is subject to contact by the down-flow of water from the reservoir to the pen nib until the entire mass of the ink material is gradually and entirely eroded and dissolved without necessity for any manipulation of the holder casing once it is attached.

While I have shown the pen equipped with the usual compressible rubber water sac 15, which is a convenient and well-known means manipulatable for water refilling purposes, it will nevertheless be understood that any other known form of refillable reservoir means may be employed for the water supply feature of the instant pen.

When the pen, with the ink holder casing below the water sac 15, as shown in Fig. 1, is not in use, but is carried pen-nib upward in the user's pocket in the customary manner, the water flows back from the feed-bar into the reservoir sac 15, during which period the ink material hardens until the downward flow of water in contact therewith recurs upon further use of the pen. The converse of this arrangement is shown in Fig. 5, wherein the ink holder casing is arranged in connection with the top end of the pen barrel 10, so that when the pen is carried in reversed position, the water from the sac 15 may flow into contact with the ink material K so that the latter may go into solution and form a liquid ink ready for use when the pen is returned to writing position. In this latter arrangement, a suitable coupling 31 is connected with the top end of the pen barrel 10, the same having at its inner end a neck 32 to engage the compressible water sac 15'. The water sac, in

this case, comprises an open ended rubber tube, the upper end of which is connected with the coupling member neck 32, and the opposite or lower end of which is suitably connected to communicate with the pen nib feed bar. The ink holder casing, in this modified arrangement, comprises the body 23 closed at its outer end, and having means at its inner end to engage with said coupling member 31. The body 33 has an axial bore 34 which aligns with a bore 35 provided in said coupling member 31. The body 33 is provided with cavities or chambers 36 to hold the mass of soluble ink material K and intercommunicating with said cavities and said bore 34 are the water access openings or slots 37. It will be obvious that in this modified arrangement the detachable and replaceable character of the ink holder means is retained, and that the latter may also be utilized as refill units.

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.

I claim:—

1. In a soluble ink fountain pen, a solvent reservoir, a solvent feed means leading directly from said reservoir to the pen nib, an ink material holder detachably fixed around and concentric to said feed means and lying between said reservoir and pen nib, said holder containing a mass of soluble ink material disposed substantially concentric to said feed means, and said holder having means of communication leading into said feed means thereby to pass solvent from said reservoir in contact with said ink material as it flows to said pen nib.

2. In a soluble ink fountain pen, a barrel, a solvent reservoir within said barrel, a throat member, a pen nib supported by said throat member, a feed bar communicating directly with said reservoir and extending from the latter to said throat member to terminate in operative relation to said pen nib, an ink material holder detachably fixed between said barrel and throat member and around and concentric to said feed bar, said holder containing a mass of soluble ink material disposed substantially concentric to said feed bar, and said holder having means of communication with said feed bar thereby to pass solvent flowing from said reservoir to said pen nib through said feed bar in contact with said ink material.

3. In a soluble ink fountain pen, a barrel, a solvent reservoir within said barrel, a throat member, a pen nib supported by said throat member, a feed bar communicating directly with said reservoir and extending from the latter to said throat member to terminate in operative relation to said pen nib, an ink material holder detachably fixed between said barrel and throat member and around and concentric to said feed bar, said holder having longitudinally disposed ink packed cavities substantially concentric to said feed bar, said holder having lateral passages opening toward said feed bar, and said feed bar having a longitudinal solvent duct and lateral means of communication between the latter and said holder passages.

RUSSELL B. KINGMAN.