SEAL RESERVOIR FOR A STYLOGRAPHIC PEN
9 Claims, 19 Drawing Figs.

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ABSTRACT: In stylographic pens of the type encompassing an ink reservoir communicant with a tubular writing pen tip, the improvement consisting of removable caps sealing both the bottom writing tip end and a vent passage in the top of the reservoir prior to use of the pen, and including an internal diaphragm in the ink capillary passage within the writing tip end.
SEALED RESERVOIR FOR A STYLOGRAPHIC PEN
BACKGROUND OF THE INVENTION

Field of the Invention

In stylographic or drafting pens a principal difficulty occurs in the drying of ink within the reservoir such that a dried ink layer clogs both the lower ink capillary passage and the upper venting passage. Such dried ink may sometimes be cleared by reciprocating the cleaning wire both through the venting and capillary passages. The present invention is directed to the means for sealing temporarily both the venting passage and the ink capillary passage so that there is no contact of the ink with the atmosphere prior to breaking of the seals and use of the pen.

SUMMARY OF THE INVENTION

According to the present invention, the ink reservoir is filled with ink in an independent unit removable supported within the pen housing in open communication with the pen tip and the outer atmosphere for venting. Top and bottom caps and an internal diametral are employed to seal the reservoir and preventing clogging of dried ink put to use. When emptied the ink reservoir can be removed from the pen housing and discarded. A new reservoir may be inserted within the pen housing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partially vertical sectional view and side elevation of an ink reservoir, according to the invention as it is positioned within a pen housing (shown in phantom);

FIG. 2 is a vertical sectional view of the ink reservoir, according to FIG. 1 provided with a cap-sealing means both for its top vent passage of the ink reservoir capillary passage;

FIG. 3 is a top view of the ink reservoir, according to FIG. 2;

FIG. 4 is a transverse sectional view of the ink reservoir, taken along line 4—4 of FIG. 2;

FIG. 5 is a transverse sectional view of the ink reservoir, taken along section line 4—4 of FIG. 2;

FIG. 6 is a vertical sectional view of a modified ink reservoir with an inclined vent passage;

FIG. 7 is a transverse sectional view of the ink reservoir, taken along section line 7—7 of FIG. 6;

FIG. 8 is a vertical sectional view of another modified ink reservoir, having a lateral plate and aperture for support of the reciprocating cleaning wire;

FIG. 9A is a fragmentary section of the lower part of the ink reservoir modified with a recess to receive a pen tip;

FIG. 9B is the lower part of the ink reservoir according to FIG. 9A, fitted with a pen tip;

FIG. 10A is a further modified lower part of the ink reservoir with a lateral sealing diaphragm extending across the lower ink capillary passage;

FIG. 10B is the lower part of the ink reservoir, according to FIG. 10A, whereby a pen tip which is brought in the lower ink passage has punctured the sealing diaphragm;

FIG. 11A is a fragmentary enlarged section, showing another modified lower part of the ink reservoir with a sealing diaphragm inside its lower ink passage, so as to be punctured by the reciprocating cleaning wire;

FIG. 11B is the lower part of ink reservoir according to FIG. 11A, whereby a reciprocal cleaning wire which is brought into the lower ink passage has ruptured the sealing diaphragm;

FIG. 12 is a fragmentary enlarged section of still another modified lower part of the ink reservoir having a pen tip-sealing diaphragm mounted in the ink capillary passage;

FIG. 12A is an enlarged detail of the FIG. 12 ink passage with sealing diaphragm adjacent the reciprocal cleaning wire;

FIG. 12B is the ink passage according to FIGS. 12 and 12A with the sealing diaphragm displaced from this ink capillary passage by means of the cleaning wire extending through the pen tip;

FIG. 13 is in part a fragmentary vertical sectional view of the top vent passage, provided with a removable folio seal;

FIG. 14 is a vertical sectional view of an airtight view within which the removable ink reservoir is packaged.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows ink reservoir 10 as it is enclosed in pen housing 12 (shown in phantom). Ink reservoir 10 is provided with an upper vent tube 18 and a lower ink capillary passage 14 which communicates with pen tip 16 (shown in phantom). In this simplified form the ink reservoir can be used for pens having a capillary fibrous pen tip, which pen tip can be an integral part of the ink reservoir.

In FIG. 2 vent 18 is shown with a removable sealing cap 20. Instead of this sealing cap 20 modified seals 76 and 78 shown in FIGS. 13 and 14 can be used. In FIGS. 2 and 4 top 26 of ink reservoir 10 provides a sealed passage 28 for the pen cleaning wire. The cleaning wire 11, as is shown in phantom, punctures the passage diaphragm 30 as the ink reservoir 10 is placed in the pen housing. Lower end 32 of the ink reservoir is also provided with removable sealing cap 34. Alternatively, seals of the type shown in FIGS. 13 and 14 may be employed. As illustrated in FIG. 5, the lower end of vent 18 is provided with an offset lateral extension 36 to prevent big droplets of ink from entering vent passage 38 during shaking of the ink reservoir. After ink reservoir chamber 40 is filled with ink 42, the top 26 is air tight secured by means of cap 20.

In FIG. 6 modified ink reservoir 10' is provided with an inclined vent 18', the lower end 44 of this vent 18' extending into the ink reservoir towards the sidewall 46 its opening 48 parallel to wall 46. Passage 28' for the cleaning wire of the pen thereby is eccentrically located in top 26'.

In FIG. 8 modified ink reservoir 10' is provided with vent 18' which vent also acts as a passage for the cleaning wire of the pen. Lower extension 50 of top 26' is provided with an axial diaphragm 52 which guides and supports the cleaning wire. Extension 50 also acts as a separator plate to prevent the admittance of big droplets of ink into vent passage 38'.

In FIG. 9A lower end 54 of the ink reservoir is provided with a recess 56 to receive a pen tip 16'' as in FIG. 9B. This recess 56 may be provided with a lateral seal 58 which is punctured by pen tip 16'', as shown in FIGS. 10A and 10B.

In FIG. 11A lower ink reservoir end 54' is shown with diaphragm 58' in its ink capillary passage 56', as cleaning wire 60 begins to rupture diaphragm 58'.

FIG. 11B shows the ruptured diaphragm 58', as the cleaning wire 60 is reciprocated into the ink passage 62 of pen tip 64.

In FIGS. 12 and 12A modified lower ink reservoir writing tip 54" is shown with diaphragm 58" located in ink capillary passage 56". The peripheral connection 66 of this seal 58" with the wall 68 of the ink capillary passage has a minimum thickness, so as to permit an easy tearing or displacement of the seal 58" from the wall 68 by means of cleaning wire 60" as is shown in FIG. 12B.

The seal 76 according to FIG. 13 is a foil seal on vent passage to be punctured. The seal according to FIG. 14 is a foil 78, which as a bag surrounds the entire ink reservoir. Thereby a vacuum may be created in this bag to enable a air tight enclosure of the ink reservoir. By breaking such a seal, air is admitted in the ink reservoir through the vent passage and thereby forces ink, which may be collected in the passage, back into the ink reservoir.

I claim:

1. An ink reservoir for a stylographic pen of the type having a barrel encompassing an ink reservoir with a pen tip communicant with said reservoir at one end of the barrel, comprising:
   A. an ink chamber;
   B. a bottom capillary passage communicant with the pen tip;
   C. a reservoir top having an axially upward extending vent passage, and
   D. a top removable semi secured to said top vent passage and a bottom removable seal secured to said bottom capillary passage.
2. A reservoir for a stylographic pen as in claim 1, wherein said stylographic pen is of the type having a cleaning wire extendible through the reservoir and into the ink capillary passage, wherein said bottom removable seal is removed, as said cleaning wire extends into said capillary passage.

3. An ink reservoir for a stylographic pen as in claim 2, said reservoir top further including an axially extending cleaning wire passage having a cleaning wire seal positioned thereon and being removable by said cleaning wire extending through said cleaning wire passage into said reservoir.

4. A reservoir for a stylographic pen as in claim 2, said reservoir top being fitted within the top of said reservoir and defining an axially, upwardly extending vent tube and a laterally extending guard beneath said tube and within said ink chamber.

5. A reservoir for a stylographic pen as in claim 2, further including:

E. a cleaning wire plate extending laterally beneath said top within said chamber and having an axial cleaning wire passage aligned with said tubular vent.

6. A reservoir for a stylographic pen as in claim 2, said bottom capillary passage of said reservoir including a pen tip recess complementally engageable with the pen tip.

7. A stylographic pen as in claim 5, including a diaphragm laterally extending across said bottom capillary passage within said pen tip recess, so as to be ruptured when the pen tip is inserted into said recess.

8. A reservoir for a stylographic pen as in claim 2, said bottom capillary passage including a diaphragm positioned within said passage and above said pen tip, so as to be displaced upon reciprocation of said cleaning wire.

9. A stylographic pen as in claim 2, wherein said reservoir bottom end is integrally configured as a pen tip defining an axial ink capillary passage leading from the ink reservoir to an inclined exterior writing surface and said reservoir top including a cleaning wire guide passage, so that said cleaning wire extends into said ink chamber adjacent said vent.