

[54] PEN WITH IMPROVED VENTILATION FOR ITS INK RESERVOIR

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[58] Field of Search 401/258-260, 223, 198, 199, 165

[56] References Cited

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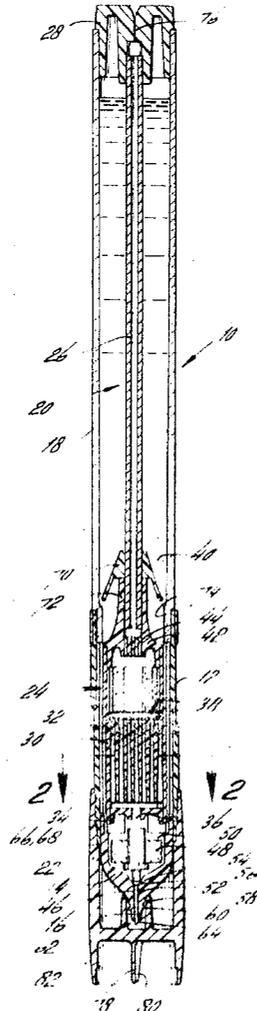
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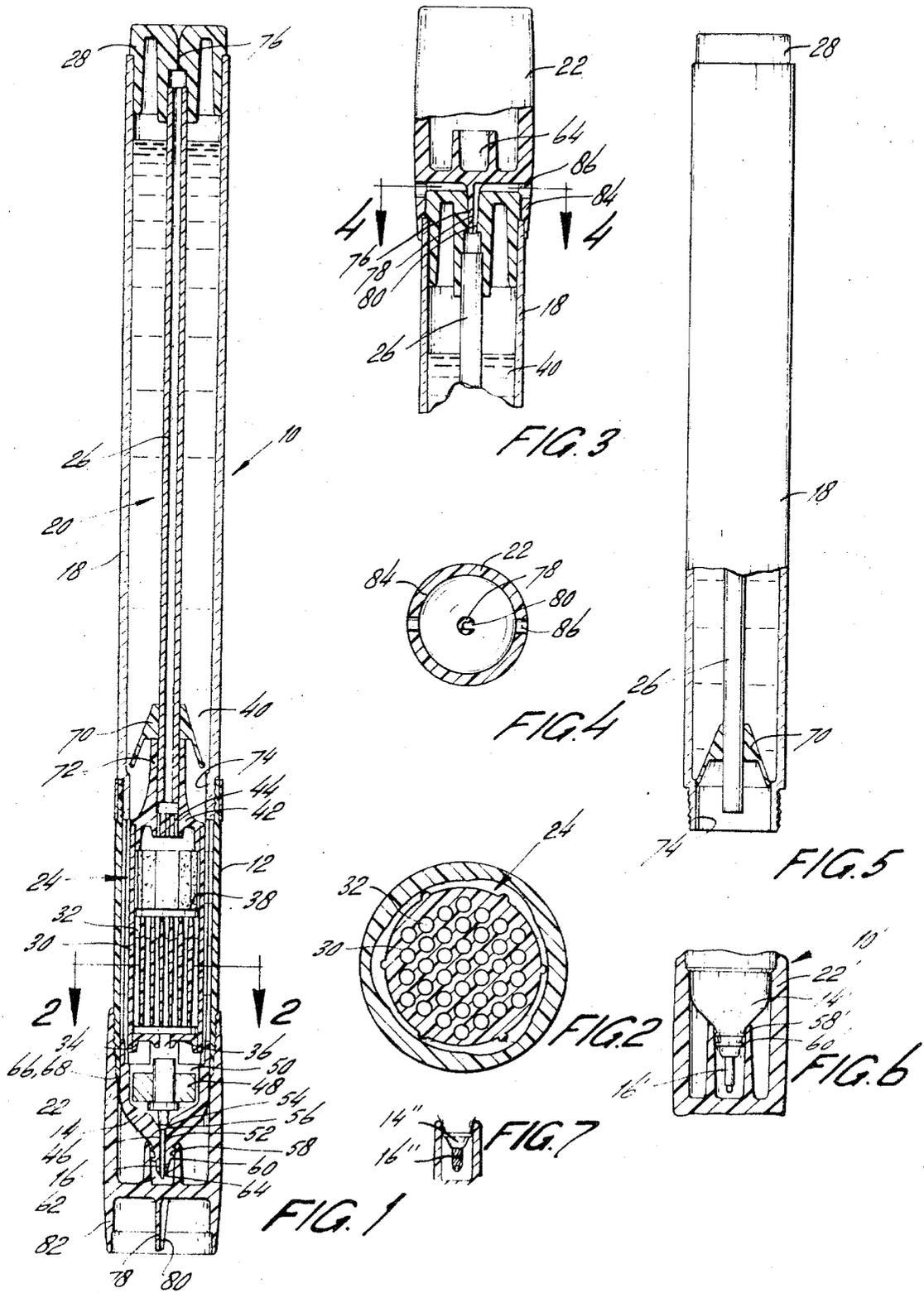
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[57] ABSTRACT

Writing or drafting pen of the type having an ink reservoir, a vent system upwardly extending from the lower end of the pen to the top of said pen and in said pen a supply source of vapor to prevent the clogging up of said vent system with dried ink.

7 Claims, 7 Drawing Figures





PEN WITH IMPROVED VENTILATION FOR ITS INK RESERVOIR

BACKGROUND OF THE INVENTION

Field of the Invention

Drafting or scribing pens are conventionally provided with an ink reservoir, a writing point communicant with the reservoir and a vent channel for the ventilation of this ink reservoir.

Major difficulties have occurred in the clogging up with dried up ink of this vent channel with eventually a complete sealed off pen interior. As a result differences in temperature of the pen interior cause an irregular ink pressurization of the ink in the pen point with unavoidable and unallowable leaking of ink in the form of droplets out of such writing point.

A periodic cleaning of such vent channel is difficult and time consuming and whereby, due to such cleaning process, too easily dried up ink particles might collect in the ink reservoir and more or less might disturb the carrying off of ink through the ink passage of the pen point.

SUMMARY OF THE INVENTION

According to the present invention the pen barrel is provided with an ink reservoir and a vent system, which upwardly extends from the lower end of the pen to the top of said pen, in said vent system a buffer for the collection of ink, forced therein from the ink reservoir, said buffer having a plurality of buffer channels with a maximum contact surface between the venting air and the ink and thereby acting as the main supply source of vapor, which vapor prevents, in combination with a seal-off structure for said vent system, the clogging up of said vent system with dried up ink. Furthermore, a multi channeled ink absorber is positioned in said vent system on top of said buffer for the collection therein of ink, which is expelled from the buffer channels, said buffer and ink absorber being part of an exchangeable throw-away buffer unit, which unit as the lower part of a divisible vent system is located in the lower part of said pen. Furthermore, an exchangeable throw-away ink reservoir with the upper part of said vent system located therein and being the the upper part of said pen.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an enlarged vertical sectional view of the pen according to the invention;

FIG. 2 is a transverse sectional view of the pen taken along section line 2—2;

FIG. 3 is a vertical sectional view of the upper end of the pen according to FIG. 1 with a protective cap connected thereto;

FIG. 4 is a transverse sectional view of the pen of FIG. 3 taken along section line 4—4;

FIG. 5 is in part a side view and vertical sectional view of the exchangeable ink reservoir of the pen according to FIG. 1;

FIG. 6 is a detail of the sealing-off structure for the pen tip of a drafting pen; and

FIG. 7 is a detail of the sealing-off structure for a pen nib, which is provided with a fibrous pen tip.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 pen 10 is shown. This pen consists of barrel 12 with nib 14 and tip 16, ink reservoir 18, which by

means of a screw thread is connected to barrel 12, vent system 20 and protective cap 22.

The vent system 20 consists of buffer unit 24, which with a slight press fit is secured in the interior of barrel 12, and the vent tube 26 provided with sealing-off cap 28, which combination is part of the ink reservoir 18.

The buffer unit 24 consists of 30 with buffer channels 32, bottom 34, which is attached to this unit and which is provided with central vent channel 36, ink absorber 38 for the absorption of ink 40, which is expelled from the buffer channels 32 and ink lock 42, which consists of a plurality of narrow capillary channels 44.

By means of buffer unit 24 the cleaning wire 46, together with cleaning wire weight 48, is displaceably enclosed in chamber 50 of pen nib 14. The cleaning wire 46 is thereby longitudinally displaceable in the ink passage 52 of pen tip 16 and whereby its weight 48 comprises seal valve 54 which, if resting upon the bottom 56 of pen nib 14, accomplishes the sealing off of ink passage 52.

The tip 16 is part of pen nib 14, which is made of synthetic material and is provided with sealing-off flanges 58 and 60. If protective cap 22 is attached to barrel 12, pen tip 16 is located in chamber 62 of cap 22 with the established sealing-off of this chamber by means of said flanges 58 and 60, which are urged against the inner wall 64 of chamber 62.

Furthermore, as a result of the urging of seal rim 66 of cap 22 against the lower end 68 of barrel 12, a second seal is obtained. During non-use of the pen 10, this combination of seals provides an effective sealing-off of the ink passage 52 of pen tip 16.

Ink reservoir 18 contains bottom piece 70, which in upward direction is displaceable over vent tube 26. This displacement is accomplished by means of upper end 72 of buffer unit 24 whereby the connection between bottom 70 and sidewall 74 of the ink reservoir 18 is broken by connecting the ink reservoir 18 and the interior of barrel 12.

Cap 28 is made of flexible material and is provided with a centrally disposed puncturable opening.

Protective cap 22 is provided with a puncturing vent pin 78 provided with venting groove 80 and jacket 82. Cap 22 is securable to the upper end of ink reservoir 18 when the pen 10 is being used, as seen in FIG. 3. In this position vent pin 78 extends through puncture 76 whereby via buffer unit 24, vent tube 26, vent groove 80 of pin 78 and vent openings 86 in the side-wall 84 of cap 22 established communication between the interior of pen 10 and the outer atmosphere is established.

In FIG. 6 pen tip 16' is part of a drafting pen and whereby flanges 58' and 60' are part of pen nib 14'.

In FIG. 7 pen tip 16' is a fibrous product. Within the scope of the invention other structures for the pen tip are possible.

I claim:

1. A pen, comprising:

- a barrel,
- an ink reservoir within said barrel,
- a pen point at the lower end of said barrel and in communication with said ink reservoir via capillary tubing,
- venting means extending upwardly from the lower end of said reservoir, and
- a buffer within the lower end of said venting means for collecting ink received from said reservoir, said

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buffer comprising a plurality of separated, non-capillary channels.

2. A pen as in claim 1, including a second buffer within said venting means comprising a plurality of narrow channels and a communication chamber interposed between said buffer and said second buffer.

3. A pen as in claim 2, wherein said buffer further comprises a bottom member provided with a central venting channel.

4. A pen as in claim 3, whereby said venting means includes an ink absorber comprising a plurality of capillary passages.

5. A pen as in claim 4, wherein said ink absorber includes a liquid vaporizable under room temperature.

6. A pen as in claim 5, wherein said barrel comprises upper and lower sections, said upper section comprising an exchangeable ink reservoir and the upper portion of said venting means.

7. A pen as in claim 6, including a cap of flexible material positioned to seal off said upper portion of said venting means, said cap including a longitudinally extending portion capable of being punctured but normally being closed.

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