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2,105,189

FOUNTAIN PEN

Filed Aug. 13, 1935

FIG. 1.

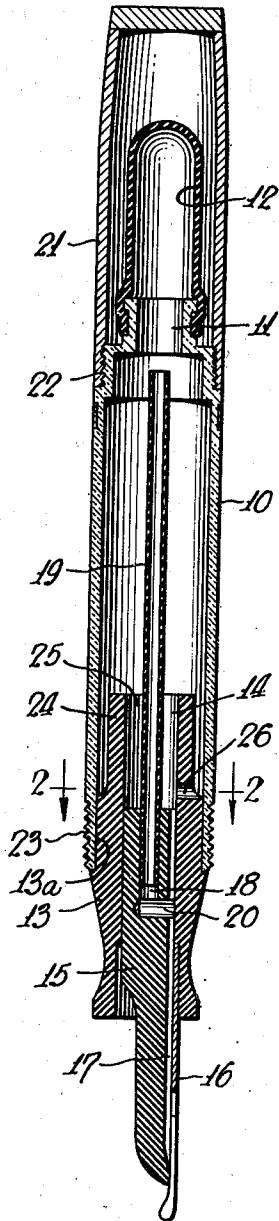


FIG. 2.

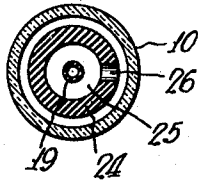


FIG. 3.

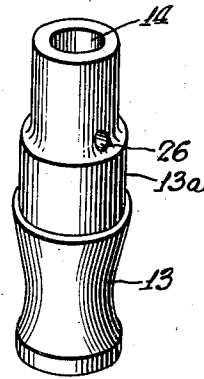


FIG. 4.

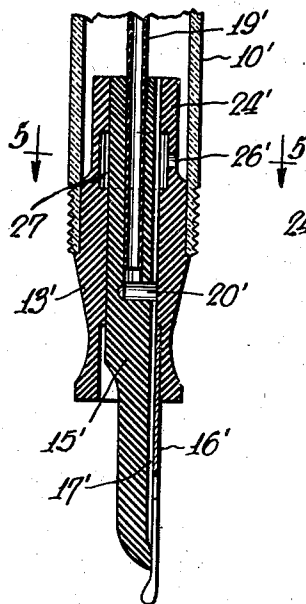
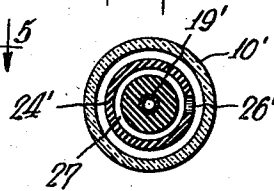


FIG. 5.



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FOUNTAIN PEN

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4 Claims. (Cl. 120—52)

My present invention relates to fountain pens and is more especially concerned with fountain pens of the familiar vacuum filler type.

As conducive to a clear understanding of the invention, it is noted that such pens as commonly made, have in practice been subject to rapid leakage as the ink in the pen barrel approaches exhaustion. This leakage is due to the expansive pressure exerted on the relatively large body of air in the pen barrel as the same becomes heated during handling or otherwise, with the consequent rapid expulsion through the ink feed of the small residue of ink.

An object of the present invention is to provide a fountain pen of the above type in which the rate of feed remains uniformly reliable, substantially to the complete exhaustion of the ink from the barrel, and this, without resort to added parts or other complications, or enhanced cost of production.

In the accompanying drawing, in which is shown one of various possible embodiments of the several features of the invention,

Fig. 1 is a view in longitudinal cross-section through one embodiment,

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1,

Fig. 3 is a perspective view of the grip section,

Fig. 4 is a fragmentary sectional view similar to Fig. 1 of an alternative embodiment, and

Fig. 5 is a transverse sectional view taken on line 5—5 of Fig. 4.

Referring now to Figs. 1 to 3 of the drawing, the pen in its general outline is of the conventional type shown in the expired patent to Taylor, 302,668, dated October 24th, 1905.

The pen preferably includes the barrel 10 reduced at its rear end to afford a neck 11 about which may be affixed a rubber bulb 12 through which the suction or so-called vacuum is applied in filling. At the forward end of the barrel is the grip section 13, which may be frictionally or otherwise secured therein in liquid-tight relation. This grip section has an axial cylindrical bore 14 into which fits the feed section 15, with the usual convexity for accommodating the pen nib 16, the shank of which is frictionally seated in the forward end of the grip section and covers the ink duct 17 which extends the entire length of the feed section and communicates with the contents of the barrel. In a corresponding socket 18 in the rear end of the feed section is mounted the air tube 19, extending axially substantially the height of the ink barrel. The socket 18 communicates by means of a cross-passage 20 with

the ink duct 17 of the feed. The cap 21 is removably threaded at 22 upon the rear end of the barrel to protect the bulb 12 in normal use, and the conventional fountain pen cap (not shown) can be frictionally fitted over the cap 21 or alternatively threaded at 23 over the forward end of the barrel to cover the nib when the pen is out of use.

According to the present invention the grip section 13, instead of terminating as customarily, substantially flush with the friction fitted portion 13a thereof, has an integral cylindrical extension 24, which protrudes upward into the barrel for a substantial distance, ordinarily in the order of $\frac{1}{8}$ or $\frac{1}{2}$ inch. In a preferred embodiment the extension affords only slight clearance with respect to the bore of the barrel. In practice, for a barrel of conventional bore of .406 inch, the grip section extension 24 would ordinarily have an outer diameter of .312 inch, thereby affording a cylindrical restriction passage .042 inch wide. The dimensions specified are satisfactory in use, but are intended as merely one illustrative embodiment of the invention, which is of course not confined to these precise dimensions.

The air tube 19 has clearance 25 with respect to the bore of the extension 24, such clearance in practice being in the order of .05 inch.

Aligned with the ink duct 17, the grip section preferably has a transverse port 26 at the base of the extension 24 for a purpose which will appear in the operation set forth.

In use, the pen is charged in the conventional way by dipping the nib into a bottle of ink and alternately pressing and releasing the bulb 12. As is well known, in this operation, at each suction stroke ink is drawn in and on each compression stroke air and ink are expelled, but each stroke represents a gain, inasmuch as the intake of ink on each suction stroke substantially exceeds the expulsion of ink included in the mixture of air and ink expelled on each compression stroke. This operation is in accordance with the teachings of the Taylor patent above identified.

As the contents of the barrel are consumed in use of the pen, ink is replaced by air. When the ink has been consumed to the point where the volume of air is many times the residual volume of ink, it is apparent that with rise of temperature incurred from time to time in the ordinary carrying or use of a fountain pen, the expansive pressure of the air will not, in the case of the present construction, cause undue loss of ink or excessive rapidity of feed.

This is explained by the fact that when the

ink is consumed down to the level of the top of the extension 24 not only is the residual ink volume reduced to the extent of the space occupied by the extension wall 24, but the surface exposed to the flow of this residual ink is increased by the entire superficial area of the inner and outer wall of said extension, thereby greatly increasing the resistance to the flow of ink. Moreover, the width of the annular passage between the air tube 19 and the bore of extension 24 is so small as to impose substantial frictional resistance to the flow of ink, and that is also true with regard to the annular passage between the bore of the barrel 10 and the outer wall of the extension 24.

It is seen that despite the presence of the wall 24, the ink nevertheless can be substantially completely drained from the pen barrel, the cavity between the extension 24 and barrel 10 being drained through the port 26.

The embodiment of Figs. 4 and 5 is generally similar to that of Figs. 1 to 3, and corresponding parts bear corresponding numerals primed.

The embodiment of Figs. 4 and 5 presents the difference that the extension 24' of the grip section has an inner, wide shallow peripheral groove 27 with which communicates the port 26' at the base of the extension 24'. This arrangement has the advantage that port 26' is in communication with the ink duct 17' without need for the alignment required in the embodiment of Figs. 1 to 3 between port 26 and ink duct 17. The operation of the embodiment of Figs. 4 and 5 is identical with that of Figs. 1 to 3.

It is of course understood that the invention may be embodied in various conventional types of so-called vacuum filler pens, regardless whether use is made of the conventional bulb 12, illustratively shown, or of any of various known equivalent piston or plunger constructions suitable for the purpose.

It will thus be seen that there is herein described an article in which the several features of this invention are embodied, and which article in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, 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.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A fountain pen of the vacuum filler type, comprising a barrel having suction applying means at the outer end thereof and having a grip section at the forward end thereof, a feed sec-

tion frictionally fitted in said grip section and having a restricted ink passage therealong in communication with the barrel, an air tube secured in said feed section and protruding into said barrel and having communication at its outer end with the ink passage of the feed section, said grip section having an extension protruding into the barrel, of diameter slightly less than the bore of the barrel, and slightly greater than the outer diameter of the lower end of the air tube encircled thereby and thereby resisting the escape of the ink from the barrel to the feed section.

2. A fountain pen of the vacuum filler type, comprising a barrel having suction applying means at the outer end thereof and having a grip section at the forward end thereof, a feed section frictionally fitted in said grip section and having a restricted ink passage therealong in communication with the barrel, an air tube secured in said feed section and protruding into said barrel and having communication at its outer end with the ink passage of the feed section, said grip section having an extension protruding into the barrel of diameter slightly less than the bore of the barrel, a port through the lower end of said extension to permit drainage of ink from the restriction passage about said extension to the feed section, the inner wall of said extension having clearance with respect to the outer wall of the air tube encircled thereby.

3. As an article of manufacture for use in a vacuum filler fountain pen, a grip section having a bore therein, a feed section frictionally fitted therein, said feed section having a narrow ink feeding duct longitudinally thereof, an air tube carried by said feed section, a transverse passage through said feed section affording communication from said air tube to said ink feeding duct, said grip section having a median portion adapted for attachment into a pen barrel and having a somewhat reduced cylindrical extension thereabove, affording a cylindrical passage with respect to said barrel, of in the order of .04 inch said extension having a transverse port at the junction between the grip mounting portion and the extension.

4. A vacuum filler fountain pen of the type comprising a barrel, a grip section securely fixed therein having an extension portion at the rear end thereof affording clearance with respect to the bore of the barrel, a feed section in said grip section, an ink duct longitudinally of the feed section, an air tube axially of the feed section and protruding into the barrel, a transverse passage affording communication between the air tube and the ink duct, a peripheral groove in the interior of said extension near the lower end thereof, communicating with the ink duct, and a port near the lower end of the extension communicating with said groove.

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