



# UNITED STATES PATENT OFFICE

2,170,242

## FOUNTAIN PEN

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Application March 11, 1938, Serial No. 195,296

3 Claims. (Cl. 120-42)

The present invention is concerned with fountain pens, and more especially with fountain pens of the vacuum type.

An object of the invention is to provide a fountain pen of the type referred to, which combines simplicity, durability and low cost of manufacture, with effective operation in use, and which is not subject to flooding as a result of expansion of the air in the pen barrel, due to heat transmitted from the hand in use.

A feature of the invention is a self-contained unit, which includes the ink reservoir, the neck section, the feed section and the nib, and which is readily mountable into or dismountable from a pen barrel, affording a heat insulating air jacket about the ink reservoir.

Various other objects, features and advantages of the invention will be apparent from the following particular description, and from an inspection of the accompanying drawing, in which

Fig. 1 is a view in longitudinal, cross-section, showing the invention on an enlarged scale, applied to one desirable form of fountain pen, with the collapsible portion of the ink reservoir in fully inflated condition,

Fig. 2 is a fragmentary view in longitudinal cross-section of the upper end of the fountain pen, but showing the cap removed, and the collapsible portion of the ink reservoir in collapsed position during ink filling operation,

Figs. 3, 4 and 5 are transverse sectional views taken respectively on lines 3-3, 4-4, and 5-5 of Fig. 1, and

Fig. 6 is a perspective of the lever for collapsing the flexible portion of the ink reservoir.

Referring now to Fig. 1, there is shown a fountain pen of conventional external appearance, which has a removable cap (not shown), adapted in closed position of the pen to be screwed upon the threaded portion 13 of the barrel 10. In the interior of the barrel 10 is an ink reservoir 14, comprising a cylindrical tube 15, desirably of rigid transparent material such as glass or Celluloid, and a flexible bulb 16, advantageously in the form of a rubber nipple, slipped tightly over the upper end of said tube, and firmly cemented in sealing relation thereto. Desirably embracing this tube 15 at the lower end of the nipple 16, and cemented to said tube and said nipple is a ring 18 of hard rubber or the like, having an external diameter slightly smaller than the internal diameter of the barrel 10, and serving to center the upper section of the ink reservoir 14 with respect to said barrel, and to prevent the reservoir 14 from tilting with respect to the barrel 10.

At the forward end, the ink reservoir 14 has a neck section 20 of hard rubber or the like, with an accurately reamed axial hole 21, which frictionally accommodates the feed section 22, and the nib 11. The upper end 24 of the axial hole 21 is enlarged in diameter to snugly accommodate the lower end of the tube 15, and to form an annular seat 25 for the lower end of said tube. The tube 15 is secured and sealed to the section 20 by cement or the like. An air vent tube 27 extends axially in the feed section 22, with its upper end extending into the bulb chamber, and communicating at its lower end through a transverse passage 28 in the feed section 22, with feed duct 30 longitudinally therealong.

The ink reservoir 14 with its bulb 16, section 20, feed section 22 and nib 11, form a self-contained unit, which can be easily mounted in or dismounted from the barrel 10 as such, and which is retained in said barrel by the frictional engagement of the lower end of said barrel with a reduced neck 29 of said section 20. The ink reservoir 14 is of smaller external diameter than the internal diameter of the barrel 10, and when mounted in the operative position shown in Fig. 1, affords a cylindrical air space 31 between said barrel and said ink reservoir, which acts as a heat insulator, especially desirable in a vacuum pen of the type shown, in which the space left in the ink reservoir by the exhausted ink is replaced with air admitted through the air vent tube 27. The barrel 10 is desirably provided with a series of holes 32, designed to prevent the pressure of the air in said barrel from rising and causing flooding.

The upper end of the barrel 10 carries a lever 35, which serves to collapse the bulb 16 in filling. For that purpose the rear open end of the barrel 10 has press-fitted or otherwise firmly secured therein a plug 36, having an upwardly extending nipple 37, provided with an external thread 38 for receiving a cap 39. Nipple 37 is provided with a central elongated slot 40, extending the full length thereof for receiving the lever 35. This lever 35 is desirably made from a flat strip of metal, stamped to form a substantially flattened bulb-engaging arm 41 of single thickness at its lower forward end, and a reversely bent rear arm 42, forming a rigid bar shank of substantially rectangular cross-section extending in the slot 40. The lever 35 is pivotally supported on the plug 36 by a pivot pin 43, desirably press-fitted through diametrically aligned holes 44 in nipple 37, and passing loosely through the shank 42 of said lever. The upper end of this shank 42 extends

upwardly beyond nipple 37, and desirably has frictionally secured thereto a button 45, serving as a thumb piece in the operation of said lever, and provided with a curved thumb engaging face 46.

The bulb engaging arm 41 of the lever 35 is offset at 47, so that said arm in the inflated position of the bulb 16, will conform generally with the contour of said bulb as shown in Fig. 1, and will effect the complete collapse of the upper portion of said bulb in the bulb collapsing position shown in Fig. 2. The lower end 48 of the bulb engaging arm is desirably turned outwardly, so that it will not dig into the bulb 16 and injure it during bulb collapsing operation. The inherent resiliency of the bulb 16 will serve to maintain the lever 35 in the inoperative position shown in Fig. 1, without the usual expedients of springs or the like, and will serve to return said lever to this position after it is manually released, following the bulb collapsing operation shown in Fig. 2.

The upper end of the lever 35 when not in use is enclosed in the cap 39, threaded on to nipple 37, and having an outer surface continuous with the outer surface of the barrel 10.

The unit comprising the reservoir 14, with its bulb 16, section 20, feed section 22, and nib 11, may be easily removed from the barrel 10 for cleaning and repairing purposes, and the unit when thus removed lends itself to internal washing as easily as does the conventional eye dropper, the result of said washing being made apparent through the transparent reservoir 15.

The bulb collapsing means, consisting of a simple lever, is not apt to get out of order, as is the more conventional and expensive presser bar and leaf spring assemblage. This lever is rendered easily accessible for filling operations by the mere removal of the cap 39, so that this filling can be accomplished without the necessity of removing the barrel 10.

The rigid reservoir section 15 surrounding the vent tube 27, protects said tube against damage, especially during bulb collapsing operations shown in Fig. 2, and the lever section 41 is sufficiently short so as not to interfere with said vent tube.

By means of the present construction, the air space 31 serves to effectively prevent the transmission of body heat from the pen holding hand to the reservoir 14, so that the air in said reservoir is not expanded to flood the pen, after a comparatively long writing period, even when this reservoir is almost empty.

The apertures 32 are so arranged and distributed on the barrel 10, that they will not all be covered at the same time by the pen holding hand, so that the pressure in said barrel will not be permitted to build up by the heat of said hand sufficiently to collapse the bulb 16, and flood the pen, but will be released through said apertures.

The spacing of the ink reservoir 14 from the outer barrel 10, serves also to protect said reservoir against possible damage.

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

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

1. A heat insulated fountain pen comprising a section having a feed therein, a pair of concentric air spaced tubes mounted coaxially of said section and rigidly affixed thereto, the inner of said tubes constituting an ink reservoir and the outer one the barrel of the pen, a short rubber nipple closing the upper end of the reservoir, rigid means closing said barrel and enclosing said nipple, said barrel having one or more vent apertures therein.

2. A fountain pen of the vacuum type including a section carrying a feed and a nib, an ink reservoir tube fitted in a corresponding groove in the end of said section, a short rubber nipple encircling the upper end of said reservoir tube and adapted for cooperation with a filling means, and an outer barrel extending about said reservoir tube and peripherally spaced therefrom, said outer barrel having one or more venting apertures.

3. A fountain pen of the vacuum type including a section carrying a feed and a nib, an ink reservoir tube fitted in a corresponding groove in the end of said section, a short rubber nipple encircling the upper end of said reservoir tube and adapted for cooperation with a filling means, and an outer barrel extending about said reservoir tube and peripherally spaced therefrom and a ring of rigid material encircling said reservoir tube and located adjacent said nipple and serving to center the upper section of the reservoir tube with respect to the barrel, said barrel having one or more vents.

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