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PISTON FOUNTAIN PEN INCLUDING RESERVE INK CHAMBER

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The present invention relates to a fountain pen having a piston, and a main chamber as well as a reserve chamber for ink.

It is an object of the invention to simplify the construction of such a fountain pen.

It is another object of the invention to improve the safety of operation of the fountain pen.

The invention is directed above all to the advantageous shape of the piston, in the head of which is provided a chamber for reserve ink.

The essential features of the invention will become apparent from the following description. The accompanying drawing illustrates, by way of example only, two constructional forms of the invention, whereby

FIG. 1 is a section showing one constructional form of a piston head for a fountain pen according to the invention;

FIG. 2 is a section showing another constructional form of the piston head according to the invention; and

FIG. 3 is a section of a fountain pen having mounted therein a piston head according to the invention.

In analogy to motor vehicles which, besides the main tank, are provided with a reserve tank to tide the user over in cases of necessity, it has already been proposed to provide a main and a reserve ink chamber also for fountain pen holders.

There was no lack of solutions to realize this proposal, but they all show considerable disadvantages.

Some of the known designs provide a reserve ink chamber which may be engaged by means of a special slider; this design, however, has the disadvantage that splitting of the fingers is not excluded.

It has also been proposed to use a filling piston having a hollow piston head open at its front end, to which ink is conveyed by means of a pressure from the reserve ink chamber and from there to the main ink chamber, from where it may then be used for writing. This solution, however, involves an especially high danger of leakage.

Finally there are the so-called double pistons, to wit, two piston heads being arranged one after the other, whereby a reserve ink chamber is furnished between the two piston heads fluid of which, at a given time, is exhausted into the main ink chamber with the application of pressure means. By the double piston head, however, the total ink reserve is diminished to a considerable extent.

The present invention obviates these disadvantages.

In the constructional form of the piston head according to FIG. 1 the filling mechanism 21 being slidable arranged in the fountain pen barrel 3 consists of a pot-like hollow piston head 11 of which is rigidly connected with a piston rod 10 and arranged so as to be adapted to move in longitudinal direction. The rear wall 11 tightly seals the rear portion of the piston head 1 by means of packing elements 9, while further packing elements 2 assure a fluid-tight seal between piston head 1 and barrel 3. The drawing shows the filling mechanism in the position assumed when the ink chamber is filled up.

The pot-like hollow piston head 11 is defined by the side wall 8, front wall 5, and the above-mentioned rear wall 11, and provides reserve ink chamber 7. A small aperture 6 is provided in the reserve chamber front wall 5 and communicates the reserve chamber with main ink chamber 4. The small aperture 6 is of such size that ink contained within the reserve chamber will not escape through the small aperture except upon increase in pressure as would occur upon forcible advancing of the rear wall 11 longitudinally along the reserve chamber side walls 8. Upon writing, ink issues from chamber 4, and reserve chamber 7 remains filled since the small aperture 6 is too small for escape of ink.

When the ink contained in the main ink chamber 4 has been used up and use of the contents of the reserve ink chamber 7 is required, the rear wall 11 of the hollow piston head 1 is moved forwards by means of the piston rod 10. Due to the super-pressure in the reserve ink chamber 7 caused by the diminution of said reserve ink chamber 7 ink fluid passes through the small aperture 6 into the main ink chamber 4 and may, from there, be consumed in the usual manner.

Merely with the application of a stronger force and after the rear wall 11 rests against the front wall 5 of the hollow piston head 1, the whole piston head in the barrel 3 is moved axially through the barrel to permit a plunger action as is common in pens provided with cylinder and piston filling arrangements. The success of the operations is assured because the frictional resistance of the packing elements 2 relative to the inner wall of the barrel 3 is higher than the frictional resistance of the packing elements 9 relative to the inner wall 8 of the hollow piston.

For the operation of the filling, the rear wall 11 of the hollow piston head 1 is, due to the lower frictional resistance of the packing elements 9 relative to the inner wall 8 of the hollow piston head 1, first moved backwards up to a stop 12 by pulling the piston rod 10, and due to the suction effect the reserve ink chamber 7 thereby fills through the small aperture 6. Only now the whole piston moves backwards, until a stop 13 abuts against the surface 14 and a main ink space 4, too, is then filled up in the known manner.

FIG. 2 shows another constructional form of the invention in which the approach of the rear wall 19 towards the front wall 17 of the pot-like hollow piston is effected by pressure exerted on the piston rod 10 and by the folding of the accordion- or bellows-shaped side walls 18.

The succession of the operations for exhausting and filling of the main ink chamber 4 and the reserve ink chamber 7 is the same as that of the constructional form according to FIG. 1, and also the ratio of forces required to maintain this succession is the same as for FIG. 1. Elements 2, 3, 4, 6, 10 and 21 are identical with those shown in the first embodiment.

FIG. 3 shows a longitudinal section of a fountain pen holder in which is mounted a filling mechanism having a reserve ink chamber according to the invention. This figure represents, additionally, a writing pen point 23, a handle 20 adapted to engage the filling mechanism 21 which is not shown in detail, and the front wall 22 of the main ink chamber 4.

What I claim is:

1. A piston fountain pen comprising a barrel, a writing pen point mounted on one end of the barrel, a piston slidable arranged in said barrel, a main chamber adapted to store ink and defined by the wall of said barrel, said one end of the barrel, and said piston, said piston being hollow to provide an auxiliary chamber adapted to store reserve ink, said auxiliary chamber being defined by a front wall disposed adjacent said one end of the barrel, a rear wall, and a side wall, said front wall having a small aperture therein communicating with said main ink storage chamber, said rear wall, and said side wall, and a piston rod rigidly connected to the rear wall, whereby upon exhaustion of the main chamber, movement of the piston will advance the rear wall toward the front wall of the auxiliary chamber thereby.
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3. A piston fountain pen comprising a barrel, a writing pen point mounted on one end of the barrel, a piston slidably arranged in said barrel, a main chamber adapted to store ink and defined by the wall of said barrel, said one end of the barrel, and said piston, said piston being hollow to provide an auxiliary chamber adapted to store reserve ink, said auxiliary chamber being of pot-like shape, said auxiliary chamber being defined by a front wall disposed adjacent said one end of the barrel, a rear wall, and a side wall, said front wall having a small aperture therein communicating with the main ink storage chamber, said rear wall being slidably arranged in said side wall, a stop on said side wall limiting the rear movement of said rear wall, and a piston rod rigidly connected to the rear wall, whereby upon exhaustion of the main chamber, movement of the piston will advance the rear wall toward the front wall of the auxiliary chamber thereby reducing the capacity thereof and delivering ink through the aperture into the main chamber.

4. A piston fountain pen comprising a barrel, a writing pen point mounted on one end of the barrel, a piston slidably arranged in said barrel, a main chamber adapted to store ink and defined by the wall of said barrel, said one end of the barrel, and said piston, said piston being hollow to provide an auxiliary chamber adapted to store reserve ink, said auxiliary chamber being defined by a front wall disposed adjacent said one end of the barrel, a disk-shaped rear wall, and bellows joining said front and rear walls, said front wall having a small aperture therein communicating with the main ink storage chamber, and a piston rod rigidly connected to the rear wall, whereby upon exhaustion of the main chamber, movement of the piston will advance the rear wall toward the front wall of the auxiliary chamber thereby reducing the capacity thereof and delivering ink through the aperture into the main chamber.

5. A piston fountain pen as claimed in claim 4, wherein packing means are provided at the front end of the auxiliary chamber between the wall of the barrel and side walls of said chamber, said packing means having comparatively high frictional resistance relative to the barrel wall, whereby upon exertion of pressure on the piston rod said bellows will be pressed together and upon retraction of the piston said bellows will first be expanded before said frictional resistance will be overcome.

6. A piston fountain pen according to claim 4, wherein said bellows consist of a tube of pliable material capable of folding in the manner of an accordion.

References Cited in the file of this patent

UNITED STATES PATENTS

159,829 Van .................. Feb. 16, 1875
1,127,201 Derke .................. Feb. 2, 1915
2,257,324 Behm .................. Sept. 30, 1941
2,284,774 Smith .................. June 2, 1942
2,869,543 Ratcliff .................. Jan. 20, 1959