

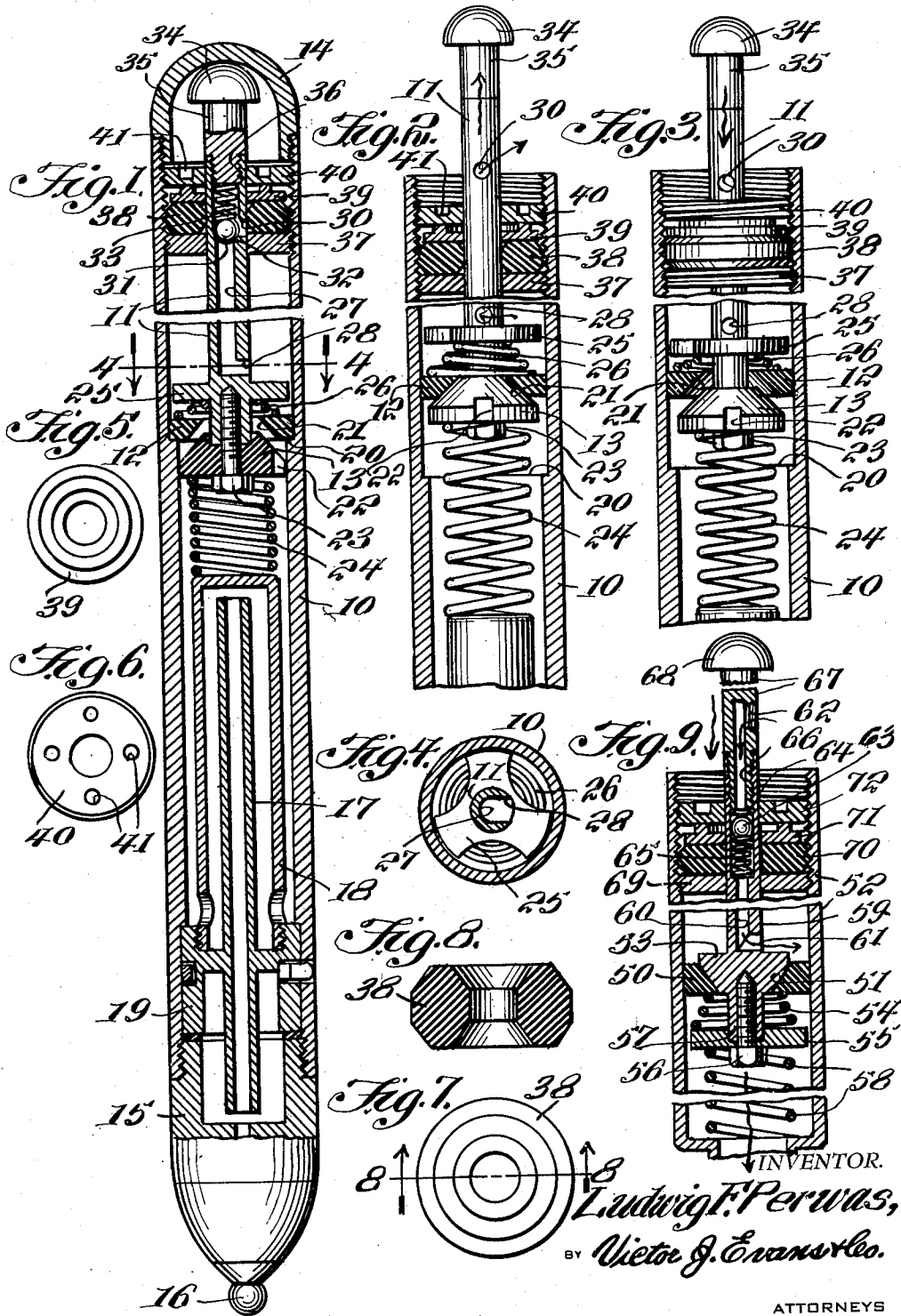
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FOUNTAIN PEN PUMPING ELEMENT

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## FOUNTAIN PEN PUMPING ELEMENT

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8 Claims. (Cl. 120—47)

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This invention relates to internal ink pumping elements for fountain pens particularly of the ball point type wherein ink is replenished by reciprocating an element in the barrel of the pen with the nib or point of the pen immersed in a supply of ink, and in particular the invention relates to a plunger having a piston with suitable valves in combination therewith incorporated in a barrel of a fountain pen with the plunger actuated by a knob on the outer end thereof and wherein the knob is covered by a removable cap on the end of the barrel.

The purpose of this invention is to provide a reciprocating piston type pump adapted to be incorporated in the barrel of a fountain pen whereby ink may be pumped into an ink reservoir in the barrel with the point of the pen immersed in a supply of ink.

This is a divisional application of my co-pending application for a fountain pen filed September 25, 1946 with the Serial Number 699,313, now Patent No. 2,476,321 granted July 19, 1949, and includes particularly the pumping instrumentalities of the pen of the co-pending application.

The object of this invention is to provide unique pumping instrumentalities of the reciprocating plunger type wherein the parts are comparatively small so that they may be incorporated in the barrel of a fountain pen without increasing the size thereof.

Another object of the invention is to provide an ink pump for fountain pens in which a piston is positioned intermediate of the length of the pen barrel and the piston is provided with a valve that is automatically opened as a closure cap is positioned on the end of the barrel whereby ink may be stored on both sides of the piston and communication is established between the ink on both sides of the piston through the piston.

A further object of the invention is to provide a plunger type reciprocating pump for fountain pens which is of a comparatively simple and economical construction.

With these and other objects in view the invention embodies a pump incorporated in the barrel of a fountain pen having a plunger with a knob on the outer end, a piston having a valve therein on the inner end, sealing washers positioned around the plunger, and a closure cap carried by the outer end of the barrel.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

Figure 1 is a vertical longitudinal section through the barrel of a fountain pen showing the

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construction of the pump in the barrel and with the lower end of the barrel broken away showing the nib in elevation.

Figure 2 is a similar view showing the end of the barrel in which the pump is positioned with the lower part of the barrel broken away and with the closure cap omitted wherein the plunger is moved outwardly by a spring in the barrel.

Figure 3 is a similar section showing the plunger with the parts positioned with the plunger moving downwardly.

Figure 4 is a cross section through the barrel taken on line 4—4 of Figure 1 showing the inner end of the opening in the plunger.

Figure 5 is a detail showing a packing washer.

Figure 6 is a detail showing a packing locking disc or nut.

Figure 7 is a detail showing an end view of a packing element.

Figure 8 is a section through the packing washer shown in Figure 7 being taken on line 8—8 of Figure 7.

Figure 9 is a vertical section through the pump housing illustrating a modification wherein the position of the valve in the piston is reversed.

Referring now to the drawings wherein like reference characters denote corresponding parts the fountain pen pump of this invention includes a barrel 10 forming a housing, a plunger 11, a piston 12 having a valve 13 therein and a closure cap 14.

In the design shown the pen is formed with a plug 15 in the lower end in which a nib 16 is carried and ink tubes 17 and 18 are mounted in an inner bushing 19. It will be understood that the pen elements in the lower end of the barrel may be of any type or design and the ink channel leading to the nib or point may be formed in any manner.

The pump piston 12, in the closed position of the pen is seated on a shoulder 20 and with the valve 13 seated on a valve seat 21 of the piston the barrel is closed at this point. The valve 13 is provided with notches 22 in the peripheral edge so that ink may pass by the valve. The valve 13 is attached to the lower end of the plunger 11 by a screw 23 and the valve is held upwardly by a spring 24 that rests on the upper end of the tube 18. The lower end of the plunger is provided with a disc or flange 25 and a spring 26 is provided between the flange and piston 12.

The plunger 11 is provided with a passage 27 having an opening 28 at the lower end and an opening 30 at the upper end. A valve is provided in the passage 27 by a ball 31 which, as shown in

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Figure 1 is held against a seat 32 by a spring 33. The upper end of the plunger is provided with a knob 34 which is positioned on the end of a stud 35 that is threaded in the upper end of the plunger 11 through a screw 36 on the lower end thereof.

The plunger 11 extends through a sealing element in the upper end of the barrel which is formed by a washer 37 that is threaded in the barrel, a packing washer 38 that is shown in detail in Figure 8, a sealing element 39 and a threaded disc or nut 40. The nut 40 has openings 41 therein for a spanner wrench or the like.

With the parts arranged in this manner the valve 13 is held in the open position by the closure 14 which, when threaded on the upper end of the barrel 10 engages a knob 34 and forces the valve 13 downwardly against the spring 24 so that the valve is in the open position. When the cap 14 is removed the spring 24 forces the plunger upwardly as shown in Figure 2 seating the valve 13 upon the seat 21, and as the plunger is forced downwardly the valve 13 moves away from the seat as shown in Figure 3 with the flange 25 compressing the spring 26 and thereby forcing the piston 12 downwardly. With the plunger moving upwardly air trapped in the barrel escapes through the opening 28, the passage 27 and the opening 30 to the exterior, the pressure of the air unseating the ball 31 and thereby opening the valve in the plunger.

In the reciprocating action of the plunger the piston 12 draws ink in through the nib as it moves upwardly and as it moves downwardly pressure is relieved by the valve 31 so that the ink is not forced out of the barrel.

With the continued reciprocation of the plunger and piston the lower part of the barrel is filled with ink and the ink then passes upwardly through the valve in the piston, filling the reservoir in the upper part of the barrel and throughout the length thereof, and as the closure cap 14 is replaced the valve 13 is moved downwardly to establish communicating means between the upper and lower sections of the reservoir.

In the modification illustrated in Figure 9 a piston 50 having a valve seat 51 therein is slidably mounted in a casing 52 corresponding to the barrel of the pen and a valve 53 on the end of a plunger is positioned to seat on the valve seat 51 of the piston as illustrated in Figure 9. In this design the valve 53 is held against the seat 51 by a spring 54 which is carried by the plunger through a disc 55 that is secured to the lower end of the plunger by a bolt 56 in a threaded nipple 57. The disc 55 is resiliently held upward by a spring 58 similar to the spring 24 of the design shown in Figure 1.

The plunger of this design which is indicated by the numeral 59 is provided with a passage 60 having an opening 61 at the lower end and an opening 62 at the upper end and this passage is provided with a valve formed with a ball 63 which is urged against a seat 64 by a spring 65. The seat 64 is formed on the lower end of a threaded nipple 66 on the end of a stud 67 on which a knob 68 is provided which is similar to the knob 34.

The plunger 59 extends through a sealing element formed with a threaded disc 69, a packing element 70, a retaining disc 71 and a disc or nut 72. The sealing elements being similar to corresponding elements of the design shown in Figure 1.

With the positions of the parts reversed as illustrated in the design shown in Figure 9 down-

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ward pressure of the plunger forces ink out of the lower end of the pen barrel and in the upward movement of the plunger the valves are open whereby air passes downwardly through the plunger and valve into the barrel to relieve the pressure therein.

The pumping elements may therefore be positioned to draw ink into the lower end of the barrel through the nib or with the parts reversed pressure may be created in a lower part of the pen to facilitate feeding ink therefrom.

It will be understood that other modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A fountain pen ink replenishing pump comprising a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger in the barrel having an end extended through the piston, a valve carried by the plunger and positioned to coact with the valve seat of the piston, means resiliently urging the valve against the valve seat of the piston, sealing elements in the outer end of the barrel through which the plunger extends, means for venting the interior of the barrel on the outer side of the piston and a closure cap removably mounted on the end of the barrel holding the valve away from the valve seat of the piston providing communicating means through the piston.

2. A fountain pen ink replenishing pump comprising a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger in the barrel and having an end extended through the piston, a valve carried by the plunger and positioned to coact with the valve seat of the piston, means resiliently urging the valve against the valve seat of the piston, said plunger having a flange thereon spaced above the piston, a spring on the plunger positioned between the flange and piston for holding the valve against the seat when said resilient means is released, sealing elements in the outer end of the barrel through which the plunger extends, means for venting the interior of the barrel on the outer side of the piston and a closure cap removably mounted on the end of the barrel holding the valve away from the valve seat of the piston providing communicating means through the piston.

3. A fountain pen ink replenishing pump comprising a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger in the barrel having an end extended through the piston, a valve carried by the plunger and positioned to coact with the valve seat of the piston, means resiliently urging the valve against the valve seat of the piston, sealing elements in the outer end of the barrel through which the plunger extends, and a closure cap removably mounted on the end of the barrel holding the valve away from the valve seat of the piston providing communicating means through the piston, said plunger having an air vent extended therethrough with a relief valve in said vent.

4. In a fountain pen ink replenishing pump, the combination which comprises a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and

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positioned to seat on the said shoulder of the barrel, a plunger in the barrel having a vent with a relief valve therein and having an extended end positioned in the valve seat of the piston, a valve carried by the extended end of the plunger and positioned to coact with the valve seat of the piston, a spring engaging the lower surface of the valve urging the valve and piston upwardly with the valve against the seat of the piston, and a closure cap removably mounted on the end of the barrel positioned to engage the end of the plunger to hold the valve away from the seat of the piston.

5. A fountain pen ink replenishing pump comprising a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger in the barrel having an end extended through the piston, a valve carried by the plunger and positioned to coact with the valve seat of the piston, means resiliently urging the valve against the valve seat of the piston, sealing elements in the outer end of the barrel through which the plunger extends, a closure cap removably mounted on the end of the barrel holding the valve away from the valve seat of the piston providing communicating means through the piston, said plunger having an air vent extended therethrough with a relief valve in said vent, and sealing elements positioned in the end of the barrel and through which the plunger extends.

6. In a fountain pen ink replenishing pump, the combination which comprises a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger having a finger gripping knob on the outer end positioned in the barrel and having an end extended through the piston, a valve carried by the extended end of the plunger and positioned to coact with the valve seat of the piston, a spring engaging the lower surface of the valve urging the valve and piston upwardly with the valve against the seat of the piston, means for venting the interior of the barrel on the outer side of the piston and a closure cap removably mounted on the end of the barrel positioned to

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engage the end of the plunger to hold the valve away from the seat of the piston.

7. A fountain pen ink replenishing pump comprising a pen barrel having a shoulder therein, a piston having a valve seat therein slidably mounted in the barrel and positioned to seat on the said shoulder of the barrel, a plunger in the barrel having an end extended through the piston, a valve carried by the plunger and positioned to coact with the valve seat of the piston, means resiliently urging the valve against the valve seat of the piston, said plunger having a flange thereon spaced above the piston, a spring between the flange and piston for holding the valve against the seat when said resilient means is released, a closure cap removably mounted on the end of the barrel holding the valve away from the valve seat of the piston providing communicating means through the piston, said plunger having an air vent extended therethrough with a relief valve in said vent, and sealing elements positioned in the end of the barrel and through which the plunger extends.

8. In a pump for fountain pens and the like, the combination which comprises a pen barrel having a closure cap removably mounted on the outer end, a plunger positioned in the barrel having a finger gripping knob on the outer end, a sealing element in the barrel through which the plunger extends and in which the plunger is slidably mounted, a piston having a valve therein carried by the plunger, a spring positioned on the plunger urging the valve against the seat, said plunger having an escape passage therethrough, and a valve held by a spring positioned in the passage in the plunger.

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## REFERENCES CITED

The following references are of record in the file of this patent:

## UNITED STATES PATENTS

| Number    | Name     | Date          |
|-----------|----------|---------------|
| 1,392,838 | Lewinson | Oct. 4, 1921  |
| 1,967,580 | Larsen   | July 24, 1934 |