

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Fountain Pens of the Automatic Filling Type.

I, ERNST RICHARD ALBERT GUSTAV RÖSLER, of 75/77, Schanzenstrasse, Hamburg, Germany, of German nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Fountain pens that are automatically filled by a piston that slides within the reservoir are known, the method of filling being to first draw the piston outwardly, then to dip the open end of the fountain pen into the ink and finally to press the piston back into the barrel, whereupon just before the piston reaches the end of its stroke the ink is drawn by suction into the reservoir. These fountain pens are so constructed that the piston for the greater portion of its stroke fits closely in the reservoir within the barrel, the reservoir being slightly enlarged at that part which the piston occupies just before it reaches the end of its stroke. The consequence is, that, when the piston is again pressed inwardly after being drawn out, a vacuum is created above the piston so that as soon as the piston arrives at the enlarged part of the reservoir the ink is sucked inwardly around the piston. Fountain pens so constructed have on the one hand the drawback that the piston in moving from the enlarged part of the reservoir into the smaller part passes a shoulder which eventually causes the surface of the piston to wear and thus impairs the fit. On the other hand there is the drawback that when the ink of the previous charge is not wholly used up, owing to an unnecessary recharging or filling, the ink which is still above the piston will be pressed out at the rear end of the fountain pen, between the piston rod and its packing, when the piston is drawn out preparatory to filling the pen.

The object of the present invention is to construct an improved fountain pen the operation of which is the same as that described above, that is to say it is filled by the piston preparatory to filling being

first drawn out and then again pressed inwardly so that a vacuum is created above it and when the piston arrives at the end of its stroke the ink will pass into the space above the piston by the suction effect of the vacuum. The construction of the improved fountain pen is such that the disadvantages adherent to the shoulder on the inner wall of the reservoir in the known fountain pens are obviated, leakage of the ink by drawing out the piston owing to an unnecessary filling is entirely prevented, and moreover there is the advantage that the barrel need not be dipped into the ink until the piston is pressed inwardly right to the end of its stroke.

The construction of the improved fountain pen is somewhat similar to that of another well known type of pen which is operated differently to the kind referred to above, a piston being employed which to a limited extent is movable on its rod, is provided with a passage permitting the ink to escape and is movable between two stops on the piston rod. In the known fountain pens of this type the upper stop that is to say the stop nearest to the top of the pen, is constituted by a perforated disc, while the lower stop is dish-shaped and fits closely to the piston when the piston is drawn out. These fountain pens are operated in such a manner that the piston on being drawn out produces a suction effect and when pushed inwardly again the passage is cleared, owing to the piston rod moving relatively to the piston which is held back by friction on the wall of the reservoir so that the ink drawn up can pass above the piston through the passage and the upper perforated disc. However even this arrangement has the drawback that when unnecessarily filled the ink that remains above the piston will be squeezed out at the end of the pen.

Fountain pens have been provided with a piston movable between stops on the piston rod, the upper stop being adapted to close a longitudinal passage through the piston to enable a vacuum to be

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created in the reservoir when the piston is pushed inwardly and the other stop being arranged to leave the passage open to permit the passage of air or ink.

5 According to the present invention the fountain pen is also provided with a piston, which is movable to a limited extent on its rod and provided with a passage, and with stops on the piston rod limiting the movement of the piston, the upper one, that is to say the one arranged nearest to the top of the pen, closing the passage in the piston on contacting with the piston, while the lower stop, arranged nearest the nib of the pen always clears the passage, and a spring is provided that engages the piston rod and is put under compression when the said rod is pressed inwardly so as to automatically move it outward again when the pressure is relaxed. By these improvements over the second type of pen described above the result is obtained that the operation of the improved pen will be similar to that of the first described type while the drawbacks of these are obviated.

In the accompanying drawings:

Figure 1 is a partial longitudinal section of a fountain pen provided with the improvements according to my invention.

Figure 2 is a longitudinal section of the piston to a larger scale.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a section on the line 4—4 of Figure 2 and

Figure 5 a section on the line 5—5 of Figure 2.

Figure 6 is a longitudinal section of a modification and

Figure 7 is a cross section on the line 7—7 of Figure 6.

The piston 2 is adapted to be reciprocated within the barrel 1 forming the reservoir and is to a limited extent slidable on the rod 3 carrying at its lower end for this purpose a disc 5 covered with a packing washer 4. A stud 6 is screwed into the disc 5, its flange 7 holding the washer 4 in its place, while on its other end the stud 6 is provided with two segmental stops 8. The disc 5 and the stops 8 limit the movement of the piston 2 which is of annular form and has an aperture 9 which is not completely filled up by the stud 6 that is flattened on both sides. On its upper surface the piston is provided with an annular rib or flange 10, adapted to make a tight fit with the packing washer 4 in the upper position of the piston. The lower portion of the piston is of reduced diameter and screw-threaded exteriorly to receive a nut 12 that secures a cup leather 11 projecting below the lower

face of the piston. The upper end of the piston rod 3 passes through a screw plug 13 screwed into the upper end of the reservoir 1, within which the piston rod is packed by cork or similar stuffing material 13¹. A head 14 is mounted on the end of the rod 3, and between this head 14 and the cover 13² of the stuffing box 13, 13¹, 13² there is interposed a helical spring 15. The projecting end of the piston rod 3 with the head 14 and the spring 15 is protected by the screw cap 16.

The operation is as follows:—When the fountain pen is to be filled, the cap 16 is screwed off so as to expose the head 14. By means of this head the piston rod 3 can be drawn out with the result that the bottom of the piston 2 contacts with the stop 8 without closing the aperture 9 of the piston, as may be gathered from Figure 5. The air above the piston can therefore freely escape. When the piston comes to the end of its stroke it is pressed back into the barrel.

The piston rod 3 will move through the piston until the annular rib 10 bears against the washer 4 of the disc 5. The passage 9 now being completely closed further inward movement of the piston produces a vacuum above it. When the piston reaches near the end of its stroke, and the pressure on the head 14 is diminished the spring 15 below the head will press the piston rod slightly out of the barrel 1 so that the piston 2 being held by friction against the inner wall of the reservoir the annular rib 10 separates from the washer 4. When the pen is dipped into ink before the pressure on the head 14 is relaxed the ink will, immediately contact between the rib 10 and the washer 4 is broken, be sucked above the piston by way of the passage 9, which is still not closed by the stop 8. This action will take place quite suddenly. In contra-distinction to other known fountain pens operating in a similar manner, it is not necessary to dip the pen into the ink before the pressure on the head 14 is relaxed because a perfectly close joint is established between the members 4 and 10. The danger of ink squirting out at the end of the fountain pen on drawing out the piston preparatory to the filling is obviated, because during this operation the passage in the piston is continuously open.

The application of the cup leather 11 is important. Leather collars and cork pistons are known *per se*. Both, however, have the disadvantage, that being solid bodies, they become brittle and dry up under the action of the ink. This inconvenience is overcome in the present

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instance by allowing the leather to project beyond the piston proper, and therefore it does not constitute a solid body. The lower edge of the leather cup projecting beyond the face of the piston is preferably bevelled. This gives the advantage that the cup in the downward movement of the piston expands, thus adhering closely to the wall of the reservoir and improving the vacuum. At the same time the piston will be firmly held in its final position, and the moving of the piston rod is facilitated. Moreover it secures an absolutely correct operation of the fountain pen because even if the bore is not absolutely true the cup leather passes easily over inequalities and thus always ensures a good fit.

Figures 6 and 7 show a modified construction of the fountain pen shown in Figures 1 to 5. It may happen that the reservoir cannot be fully emptied by use and that sometimes even the ink above the piston is held back without running to the nib. The reason of this is that the ink, owing to its adhesive nature is apt to cling to the inner parts of the fountain pen and owing to its surface tension is prevented from flowing through the passages and openings in the piston. This drawback is overcome in the construction shown in Figure 6 by air passages being provided separately from the ink passages proper. These air passages allow the escape of the air from the front to the back of the piston in the position of the piston while the pen is in use.

With this object in view the stud 6 has a central bore 17 which extends above the upper face of the piston 2, and which is in connection with the space above the piston by passages 18. In moving the piston inwardly these passages 18 are inoperative so long as the packing members 4 and 10 are in contact with one another, so that a vacuum can be created above the piston. The operation of these air passages can be assisted by a tube 19 leading up into the bore 17 and preferably cut obliquely at its end, to prevent ink adhering thereto, but the horizontal position and the small size of the passages 18 tend to prevent the ink from entering the bore 17 and the tube 19 whilst the pen is in use. The tube 19 is in communication with the feeding groove 21 of the ink conduit 22 by the channel 20.

As may be gathered from Figure 7 instead of employing the passages 18 the stud 6 may be provided with double slots 23 along the whole length of the central bore 17, an air feeding tube 19 being provided in connection therewith.

By this construction the air passages are advantageously increased.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An automatically filling fountain pen comprising a piston provided with a longitudinal passage and a piston rod having stops between which the piston is adapted to slide longitudinally on said piston rod, the upper stop being adapted to close said passage in the piston and the other stop to clear said passage when contacting with the piston, and a spring that engages the piston rod and is put under compression when the said rod is pressed inwardly so as to automatically move it outwardly again when the pressure is relaxed.

2. An automatically filling fountain pen comprising a piston provided with a longitudinal passage for ink, a piston rod having stops between which the piston is adapted to slide longitudinally on said piston rod, the upper stop being adapted to close said passage in the piston and the other stop to clear said passage when contacting with the piston, and a special air passage adapted to allow air accumulated below the piston when the pen is in use to escape above the piston.

3. An automatically filling fountain pen comprising a piston provided with a longitudinal passage for ink, a piston rod having stops between which the piston is adapted to slide longitudinally on said piston rod, the upper stop being adapted to close said passage in the piston and the other stop to clear said passage when contacting with the piston, and a bore in that part of the piston rod on which the piston slides, said bore extending above the piston and communicating with the space above the piston by passages.

4. An automatically filling fountain pen according to Claim 3 characterised by a tube passing up through the bore of the piston rod and communicating with the feeding groove of the ink conduit.

5. An automatically filling fountain pen according to Claim 3 characterised by the fact that communication with the space above the piston is established by slots in the piston rod communicating with the inner part of the bore.

6. An automatically filling fountain pen substantially as described and shown.

Dated this 1st day of December, 1924.

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[This Drawing is a reproduction of the Original on a reduced scale.]

