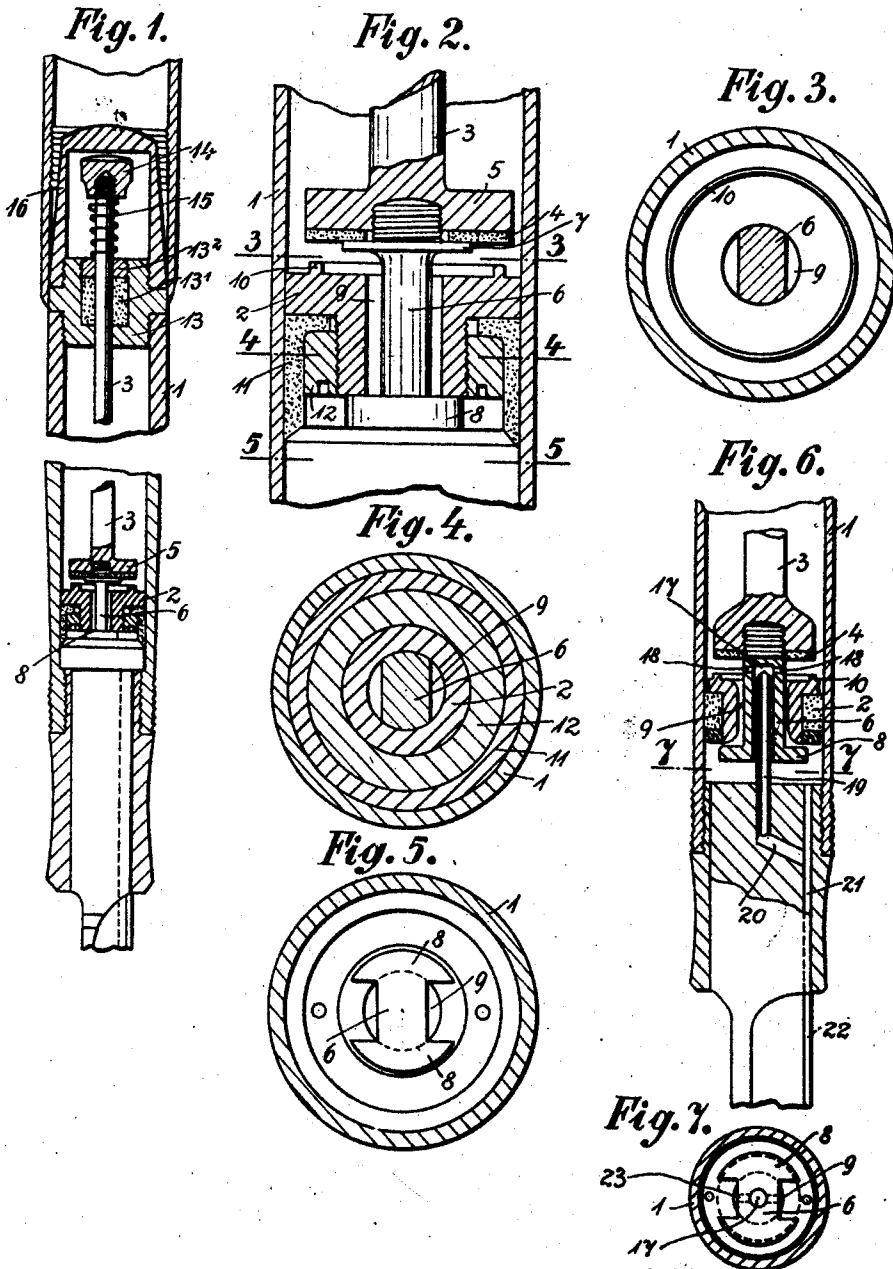


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E. R. G. A. RÖSLER
AUTOMATICALLY FILLING FOUNTAIN PEN

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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-FILLING FOUNTAIN PEN.

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To all whom it may concern:

Be it known that I, ERNST RICHARD GUSTAV ALBERT RÖSLER, a citizen of Germany, residing at Hamburg, Germany, have invented certain new and useful Improvements in an Automatically-Filling Fountain Pen (for which I have filed application in Germany partly on Oct. 19, 1923, and partly on January 18, 1924), of which the following is a specification.

Automatically filling fountain pens having pistons slidable within the fountain are known which operate in such manner, that at first the piston is moved outwardly, then the opening of the fountain pen is dipped into the ink, and then the piston is again pressed back into the holder, whereupon shortly before the lower end position is arrived a sudden sucking up of the ink takes place. Such fountain pens are so constructed that the piston for the greater part of its stroke closely fits in the fountain within the holder, the fountain being slightly widened at the end of the stroke shortly before the piston has been fully moved inwardly. The consequence is, that, when the piston is again pressed inwardly after the first pulling out, a vacuum is created behind the piston, thus as soon as the piston arrives at the widened part of the fountain the ink is sucked inwardly round about the piston. Such fountain pens have on the one hand the drawback, that the piston in moving from the expanded part of the fountain into the narrower part passes a shoulder, which by and by causes a wearing away of the surface of the piston and thus impairs the good fit. On the other hand there is the drawback, that, when the ink of the previous charge is not fully used up, owing to an untimely recharging or filling, the ink, which is still behind the piston, will be pressed out at the hinder end of the fountain pen, between the piston rod and its packing, when the preparatory pulling out of the piston rod is carried out.

The object of the present invention is to construct an improved fountain pen the operation of which is the same as described, that is to say that it is filled in this manner that the piston preparatory to the filling is first pulled out and then again pressed inwardly, so that behind it a vacuum is created and that thereupon when the piston

arrives at the end of its stroke the ink will pass in the space behind the piston by the sucking action of the vacuum. The construction of the new improved fountain pen is such that the drawbacks adhering to the shoulder on the inside wall of the fountain in the known fountain pens are removed, a squeezing out of the ink in pulling out the piston owing to an untimely filling is fully prevented, and moreover there is the advantage that the holder need not be dipped into the ink until the piston is fully pushed inwardly.

The construction of the new fountain pen is similar to another known fountain pen, which however operates in a different manner, and in which a piston is used, which to a limited extent is shiftable on its rod and is provided with an escape passage and movable between two stops on the piston rod. In the known fountain pens of this description the upper stop, that is to say the stop next to the end of the fountain pen, is formed by a broad perforated disk, while the lower stop consists of a disk, which closely fits by its edge the piston rim when pulling out the piston. These fountain pens however operate in this manner, that the piston has a sucking action in being pulled out, and when again pushed inwardly clears the passage owing to the shifting towards the end of the fountain pen, so that the inwardly sucked ink can pass behind the piston through the passage and the upper perforated stop disk. However, even this arrangement has the drawback, that on an untimely filling, ink that might be left to remain behind the piston, will be squeezed out at the end of the fountain pen.

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 an escape passage; however, of the stops on the piston rod limiting the movement of the piston only the upper one, that is to say the one arranged next to the end of the fountain pen, closes the escape passage on contacting with the piston, while the lower one arranged nearer to the nib of the pen always clears the passage. By this differentiating feature with regard to the second type described above the result will be obtained, that the operation of the new fountain pen will be similar

to that of the first described type of fountain pens, while the drawbacks of these are removed.

In the drawings a mode of construction of the invention is shown.

Fig. 1 is a partial longitudinal section of a fountain pen, and

Fig. 2 a longitudinal section of the piston to a larger scale.

Fig. 3 is a section drawn to the line 3—3 of Fig. 2.

Fig. 4 is a section drawn to the line 4—4 of Fig. 2.

Fig. 5 is a section drawn to the line 5—5 of Fig. 2.

Fig. 6 is a longitudinal section of a modification of the fountain pen, and

Fig. 7 is a cross section drawn to the line 7—7 of Fig. 6.

Within the handle body 1 forming the fountain a piston 2 is movable and to a limited extent slidable on the rod 3 carrying at its lower end for this purpose a disk 5 covered with a packing washer 4. A stud 6 carrying a shoulder 7 is screwed into the said disk for holding the washer 4 in its place, while on its other end the stud is provided with two segmental stops 8. The disk 5 and the stops 8 serve for limiting the movement of the piston 2, which is formed annular and has an opening 9, which is not perfectly filled up by the stud 6 that is flattened on both sides. At its upper side the piston is provided with an annular rib or flange 10, adapted to make tight fit with the packing washer 4 in the upper position of the piston. On one part of its circumference the piston is provided with a leather collar 11 projecting below its lower face and attached therein by a nut 12. The upper end of the piston rod 3 passes through a screw plug 13 screwed into the upper end of the fountain 1, within which the piston rod is packed by cork or similar stuffing material 13^a. A head 14 is mounted on the end of the rod 3, and between this head 14 and a cover 13^b of the stuffing box 13, 13^a, there is interposed a helical spring 15. Besides, the projecting end of the piston rod 3 with the head 14 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 catching hold of this head the piston rod 3 can be pulled out. The consequence is that the underface of the piston 2 contacts with the stop 8 without closing the opening 9 of the piston, as may be gathered from Fig. 5. The air behind the piston therefore can freely escape. When then the piston comes to the end of its stroke it will be pushed back into the fountain pen. Owing to the resistance of the air the piston 2 will be moved upwardly, and will bear against the washer

4 of the upper stop disk 5 with its annular tightening rib 10. The passage 9 now being fully closed a further inward movement of the piston produces a vacuum behind it. When now the piston arrives at the lower end of its stroke, and the pressure on the head 14 is diminished the spring 15 below the head will press the piston rod to a slight extent out of the fountain pen shortly before the piston arrives at the lower end of its stroke, so that, the piston 2 being held by friction against the inner wall of the fountain, the annular flange 10 separates from the washer 4. When the holder is dipped into the ink before the pressure on the head 14 relaxes the ink will, immediately the contact between the flange 10 and the washer 4 is broken, be sucked behind the piston by way of the passage 9, which still is not closed by the stop 8. This action will take place quite suddenly. Contrary to other known fountain pens operating in similar manner, it is not necessary to dip the pen into the ink before the pressure on the head 14 is released, because a perfect close joint is guaranteed between the members 4 and 10. The danger of ink squirting out at the end of the fountain pen on pulling out the piston as is necessary for preparing the filling is obviated, because during this step of operation the passage in the piston is continuously open.

The application of the leather collar 11 is important. Leather collars or cork-pistons are known per se. Both, however, have the disadvantage, that, being solid bodies, they become brittle and dry up by the action of the ink. This inconvenience is removed in the present instance by allowing the leather to project beyond the piston proper, and therefore it does not constitute a solid body. The rim of the leather collar projecting beyond the face of the piston is preferably bevelled. This has moreover the advantage that the collar in the downward movement of the piston expands, thus adhering closely to the wall of the fountain and improving on the vacuum. At the same time the piston will be firmly held in its end position, and the shifting of the piston rod is facilitated. In drawing the piston backwards a soft or easy sliding is guaranteed, since the collar in the sucking direction will cling to the surface more easily. Besides, it secures an absolute correct operation of the fountain pen, since even on a not perfectly round bore it will snugly slip along ruggednesses and thus always form a good fit.

Fig. 6 shows a modified construction of the fountain pen shown in Figs. 1 to 5. It may happen that the pen cannot be fully emptied by writing, and that frequently even the complete amount of ink behind the piston is held back without running to the

nib. The reason of this is that the ink, owing to adhesive power clinging to the inner parts of the fountain pen and owing to its surface tension, is prevented to flow through the passages and openings in the piston. This drawback is overcome in the construction shown in Fig. 6 by air passage 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 the piston has during writing.

This object in view the prolongation 6 of the piston rod 3 has a central bore 17, the mouth of which is on the front side of the piston 2, and which is in connection with the space behind the piston by passages 18. In moving the piston inwardly these passages 18 are inoperative as long as the packing members 4 and 10 contact with one another, so that a vacuum can be created behind the piston. The operation of this air communication 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, this tube being in communication with the feeding groove 21 of the ink conduit 22 by the channel 20. The horizontal position and the small dimensions of the passages 18 prevent the ink from entering the bore 17 and the tube 19 in the writing position of the fountain pen.

As may be gathered from Fig. 7 the prolongation 6 of the piston rod 3 instead of making use of the passages 18 may be provided with double slots 23 along the whole length of the inner bore 17 at the same time arranging an air feeding tube 19.

In this construction the air ways are advantageously increased.

I claim:

1. An automatically filling fountain pen comprising a barrel, a piston in the barrel provided with a longitudinal passage, a piston rod having stops between which the piston is adapted to slide longitudinally on said piston rod, one stop being constructed to close said passage in the piston and the other stop to clear said passage when contacting with the piston, and a spring engaging the piston rod and tensioned on the latter being pushed inwardly, so as to automatically move it outwardly again, when the pressure is reduced.

2. An automatically filling fountain pen comprising a barrel, a piston in the barrel 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, one stop being constructed 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 in front of the piston during writing to escape behind the piston.

3. An automatically filling fountain pen comprising a barrel, a piston in the barrel 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, one stop being constructed to close said passage in the piston and the other stop to clear said passage when contacting with the piston, a bore in that part of the piston rod on which the piston is slidable opening out at the front of the piston and communicating with the space behind the piston by a passage.

4. An automatically filling fountain pen comprising a barrel, a piston in the barrel 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, one stop being constructed to close said passage in the piston and the other stop to clear said passage when contacting with the piston, a bore in that part of the piston rod on which the piston is slidable opening out at the front of the piston and communicating with the space behind the piston by a passage, a tube projecting into said bore of the piston rod and connected by grooves with the ink conduit.

5. An automatically filling fountain pen comprising a barrel, a piston in the barrel 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, one stop being constructed to close said passage in the piston and the other stop to clear said passage when contacting with the piston, a bore in that part of the piston rod on which the piston is slidable opening out at the front of the piston and communicating with the space behind the piston by a passage, a tube projecting into said bore of the piston rod and connected by a cross channel and a longitudinal groove with the ink conduit.

6. An automatically filling fountain pen comprising a barrel, a piston in the barrel 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, one stop being constructed to close said passage on the piston and the other stop to clear said passage when contacting with the piston, a bore in that part of the piston rod on which the piston is slidable opening out at the front of the piston and communicating with the space behind the piston by a slot in the piston rod at the inner part of the said bore.