Oct. 5, 1926. 1,602,055

G. SWEETSER

SELF FILLING STYLOGRAPHIC PEN

Filed Jan. 15, 1926

Fig. 2.

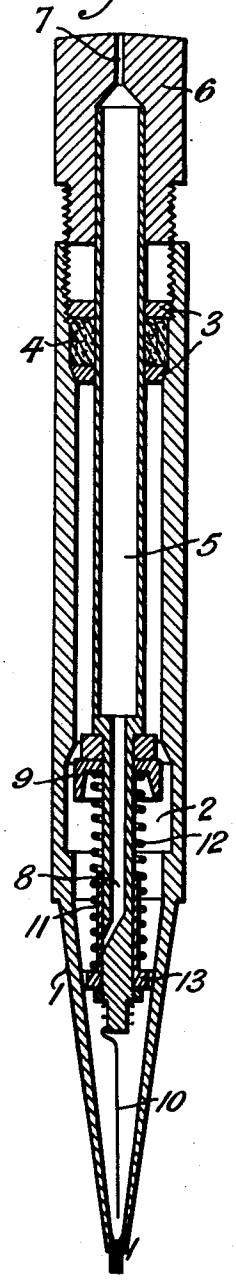


Fig. 1.

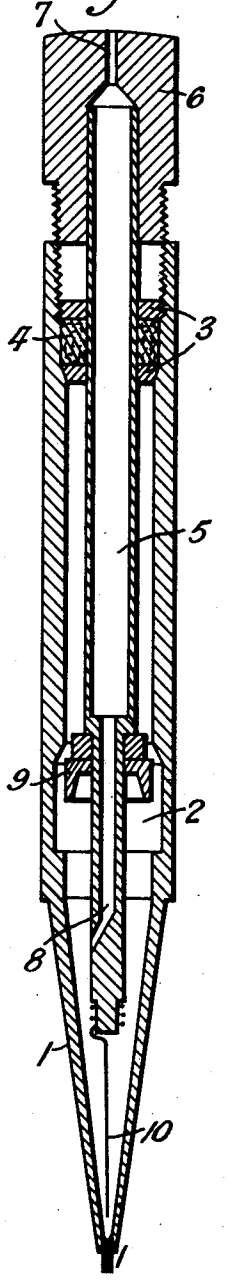
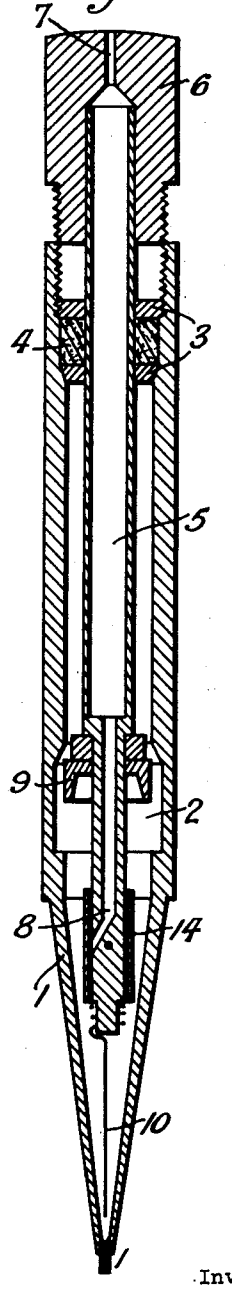


Fig. 3.



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By his Attorneys,
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Patented Oct. 5, 1926. 1,602,055

UNITED STATES PATENT OFFICE.

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SELF-FILLING STYLOGRAPHIC PEN.

Application filed January 15, 1926, Serial No. 81,420, and in Great Britain July 15, 1925.

Hitherto the self-filling mechanism of stylo-graphic pens has interfered with the principle upon which the usual stylo-pen works, more especially in respect to the necessary air-vent, and so the pens are unsatisfactory. The object of this invention is to provide the means by which a self-filling device, in its normal position, does not alter, in any way, the usual arrangement of the parts of the pen, or the principle upon which it works.

My invention consists in the adaptation to stylo-pens of self-filling means similar to that described in the patent specification No. 813534 granted February 27, 1906, in connection with ordinary fountain pens.

According to my invention the barrel of a stylo-pen is provided with a piston, and the pen is filled on the inward stroke by a vacuum being formed at the back of the piston, so that when the piston arrives at a chamber in the bore, ink flows round it and the space behind the piston is filled by atmospheric pressure. The piston rod is preferably tubular so as to form the usual central air tube, and has one air hole at its front end opening into the reservoir and another at its rear end opening into the outside atmosphere. It is fitted with the usual spring needle at its front end.

As the air passage in the piston rod would interfere with the proper working of the filling by allowing air to enter the vacuum instead of ink, air must be prevented from entering during filling. The simplest way of effecting this is to stop the rear opening by the finger while pushing in the piston. According to another method a sleeve is slidably fitted on the front end of the piston-rod, which, in its normal position does not cover the hole, but is capable of being automatically pushed over it by a spiral-spring or the like, upon the withdrawal of the piston-rod, and of being pushed off it on the inward stroke, by coming in contact with the internal cone of the nozzle of the pen. The length of the screw on the piston-rod head, which is screwed up on the completion of the filling, is so regulated that the sleeve is not pushed along, nor the air-hole uncovered, and the spring-needle does not enter the stylo-tube, until the piston-rod head is screwed up, thus preventing air from entering the vacuum in the pen and ensuring a free passage for the incoming ink through the stylo-tube.

In another form of the invention, the sleeve on the piston-rod is kept stationary on the piston-rod, covering the air hole into the reservoir. A slight clearance is left between the piston-rod and the sleeve which is made of some flexible material, preferably of india rubber, so as to be collapsible on to the air hole. The object of this is to prevent entrance of ink into the air holes due to pressure set up in front of the piston when the latter is being pushed down, which pressure the needle nipple is too small to relieve at once. When the pen is in use the clearance allows sufficient leakage of air to equalize the pressure within the pen with that of the outside air. The rear air opening is stopped by the finger during filling. A stuffing-box for the piston-rod is provided at the rear end and is slightly larger than the bore of the pen, and contains two washers surrounding the piston-rod with the packing between them, the front one being plain and butting on a shoulder of the enlargement of the bore of the barrel, and the rear one being screwed on the edge to engage the same screw in the enlargement into which the piston-rod head is screwed by a male thread. This arrangement besides giving an increased area to the packing, allows the whole of the working parts, piston-rod, stuffing box, packing and piston-rod head, to be withdrawn for inspection, all in one piece, by simply unscrewing the piston-rod head and the stuffing-box washer.

In the accompanying drawings, which illustrate my invention on a very much enlarged scale, Figure 1 shows the preferred form of the invention in which the air passage is stopped by the finger during filling, Figure 2 shows another form in which the air passage is stopped by a movable sleeve, and Figure 3 shows a third form in which the piston rod carries a sleeve fixed upon it.

The barrel of the pen is the same in all three forms. Its lower end terminates in the cone and nipple 1 usual in stylographic pens. The bore has a recess 2 which leaves a clearance for the passage of ink round the piston when the latter is pushed in, and another recess to receive packing washers 3 which are preferably two in number, with a

cork or other packing 4 between. The upper one may be screwed into place. The piston rod 5 is tubular and is provided with a head 6 which screws into the top of the barrel. In this head is an air hole 7. The lower end of the piston rod has an air hole 8 and a piston 9, and it also carries the usual spring mounted stylo needle 10.

The operation of filling is precisely the same as in the case of a fountain pen of the type described in the specification above cited.

The construction shown in Figure 2 is the same, excepting that the lower end of the piston rod carries a sleeve 11 slidably mounted upon it and urged downwards so as to tend to cover the air hole 8 by a spring 12 which bears upon a flange 13 on the sleeve. This flange is notched at the edge so as to allow the ink to flow around it. When the head 6 is unscrewed the piston rod is partially withdrawn and the hole 8 is covered. When the piston is drawn up into the barrel the sleeve moves with it, covering the hole 8 during the operation of filling. At the end of this operation the flange 13 engages with the coned end of the barrel and the air hole 8 thus becomes uncovered when the head 6 is screwed home into the barrel. In this case it is not necessary to close the air hole 7 during filling.

Another construction is shown in Figure 3. A sleeve 14 is in this case fixed on the piston rod so as to cover the hole 8. The sleeve is made of some flexible material, such as thin rubber, and is fixed in position by pins or other means, such that a slight clearance is left between it and the piston rod. When the piston is being pushed in considerable pressure is set up in front of it owing to the small size of the needle nipple 1 and this pressure tends to cause escape of ink through the air holes 7 and 8. The sleeve 14 collapses on to the air hole 8 under this pressure and prevents this escape. When the pen is in use the sleeve expands again, and the clearance between it and the piston rod allows the passage of sufficient air to equalize the inside pressure with that of the air outside and allows ink to flow. The air hole 7 must be closed by the finger during filling.

What I claim is:—

1. A self-filling stylo-pen comprising in combination a barrel having cylindrical and tapered parts, the tapered part terminating in a small hole, a piston sliding in the cylindrical part of the barrel and adapted to create a vacuum therein, a rod carrying the piston, said rod being hollow and communicating at one end with the atmosphere through an orifice adapted to be closed by the finger and at the other end with the ink reservoir within the pen so as to constitute an air vent while the pen is in use, a spring mounted needle carried by the piston-rod and adapted to project through the hole in the tapered part of the barrel, and a recess in the cylindrical part of the barrel adjacent to the tapered part, the arrangement being such that when the piston occupies the recess ink can pass around the piston and so fill the barrel.

2. A self-filling stylo-pen as claimed in claim 1, in which the stuffing box contains two washers with packing interposed between them.

3. A self-filling stylo-pen as claimed in claim 1, in which the piston-rod carries a flexible sleeve fixed upon it and covering the orifice of the air vent within the pen, a clearance for the passage of air being left between the rod and the sleeve when the latter is in its unstrained state.

In testimony that I claim the foregoing as my invention, I have signed my name this 24th day of December, 1925.

GEORGE SWEETSER.