

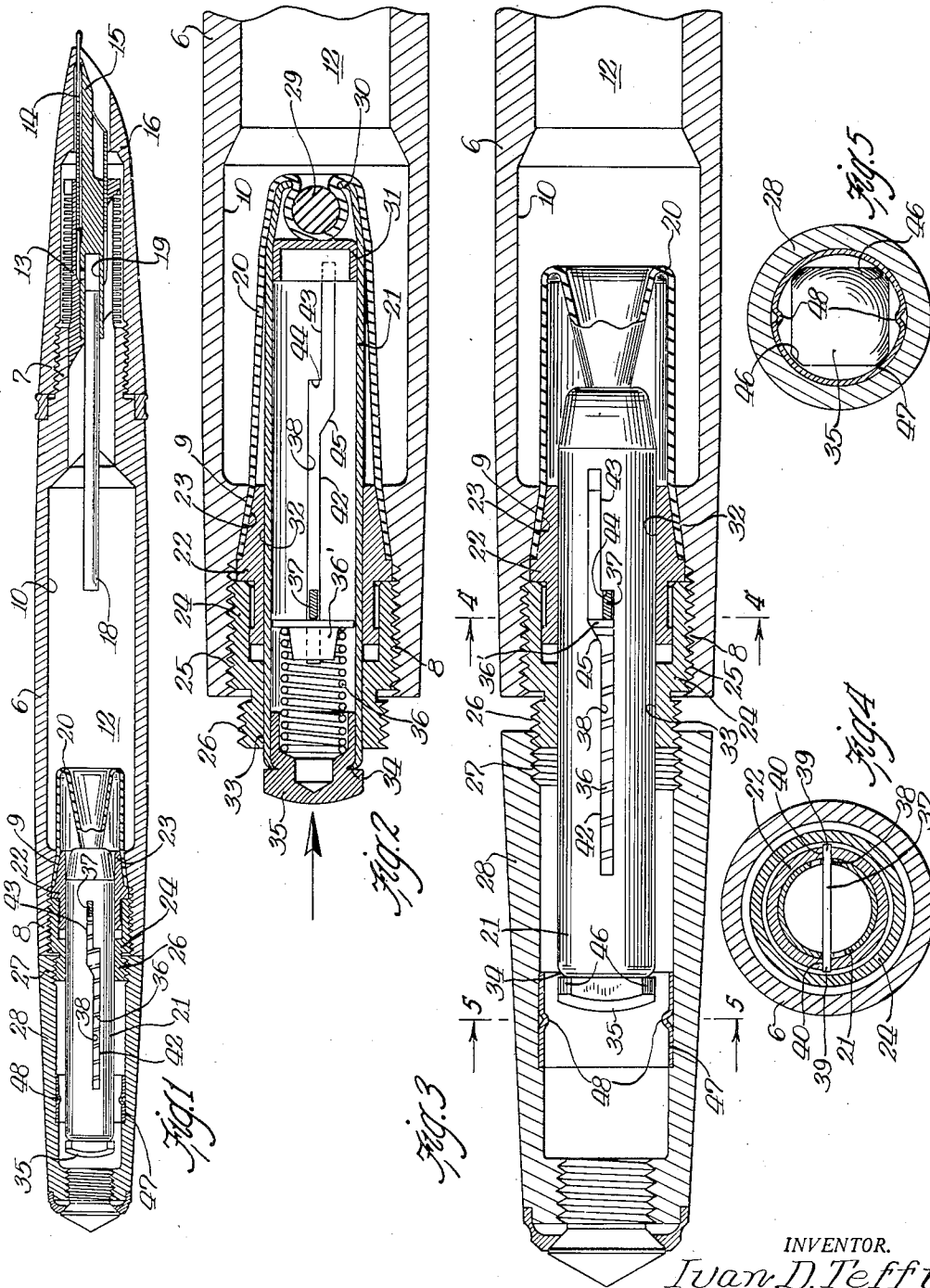
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FOUNTAIN PEN

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FOUNTAIN PEN

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The invention relates to fountain pens and more particularly to the ink feed and filling mechanisms thereof.

In some types of fountain pens an ink feed governor including an overflow ink collector is provided to control the flow of ink from the reservoir to the writing end of the pen nib and in such manner that a uniform and smooth writing performance is assured, tendency of ink to leak from the pen under ordinary conditions of use is practically eliminated, and tendency for the writing end of the pen to dry out when exposed to the atmosphere is reduced to a minimum. One form of governor of the type above described is shown in the U. S. Patent No. 2,223,541, dated December 3, 1940, to Marlin S. Baker. Pens equipped with ink feed governor mechanism of the type above described may be equipped with filling mechanism including a reciprocable filling plunger adapted normally to be covered by a closure cap, and unless the user is careful in filling the pen, the governor or collector device after filling will be full of ink, and until some of this ink is exhausted, the governor is not conditioned for proper performance of its intended overflow ink functions.

The object of this invention is to provide filling mechanism for fountain pens of the foregoing character in which the governor will not be full of ink on completion of the filling operation and in which the rotary movement of the attachment of the cap covering the exposed end of the filling plunger acts on said plunger to release it from an intermediate filling position to allow it to move to its full out-stroke position to withdraw all or substantially all of the ink from the collector device that may have been deposited therein during filling into the reservoir and without any special manipulation of the filling plunger by the operator.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawing:

Fig. 1 is a vertical sectional view through a fountain pen embodying the invention;

Fig. 2 is an enlarged detailed sectional view of the filling mechanism showing it at the end of its in-stroke;

Fig. 3 is a view similar to Fig. 2 showing the filling mechanism after completion of the filling operation and before the cap is screwed down;

Fig. 4 is a detailed vertical sectional view taken on the line 4-4 of Fig. 3; and

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Fig. 5 is a detailed vertical sectional view taken on the line 5-5 of Fig. 3.

Referring to the drawings, the pen includes a tubular barrel 6 of suitable plastic material having an externally threaded reduced barrel extension 7 and an internally threaded back end 8, the intermediate portion of the barrel forming an ink reservoir 12. The barrel 6 supports ink feed mechanism at its forward end and filling mechanism at its rear end.

The ink feed mechanism includes an overflow ink collector 13, a tubular pen nib 14, a feed bar 15, and an outer shell 16. The ink collector 13 is adapted to embrace and support the tubular nib 14 and feed bar 15, and these parts are adapted to be assembled as a unit in the extension 7 which is in direct communication with the reservoir 12. The parts 13, 14, and 15 and 16 are formed, constructed and arranged similarly to the parts 30, 31, 32 and 33 of the aforementioned Baker Patent No. 2,223,541 and function in a similar manner to control the flow of ink from the pen. As the novelty of the present invention is not in the details of the ink feed mechanism per se but only in the association of a collector type ink feed mechanism with the filling mechanism, further description thereof is deemed unnecessary.

The filling mechanism includes a so-called breather tube 18 which is mounted at its front end in a bore 19 of the feed bar 15 and which corresponds to the bore 32^a of said Baker Patent No. 2,223,541, and also as shown includes mechanism of the general character disclosed in U. S. Letters Patent No. 1,904,353, granted on April 13, 1933, to Arthur O. Dahlberg. This mechanism further includes a flexible diaphragm 20, means for clamping such diaphragm to the barrel, a reciprocatory filling plunger 21, means connecting the inner end of the plunger with the central portion of the diaphragm, spring means for returning the plunger and diaphragm on its suction stroke, and further according to this invention includes means for automatically preventing or stopping the plunger moving the full length of its stroke during filling of the pen by the operator, and means controlled by the cover cap for the plunger to release said automatic means to permit the plunger to complete its stroke and thus withdraw from the collector device any ink that may have been deposited therein during the filling operation.

The diaphragm is a thin disk of rubber or other suitable inkproof flexible material, and the means for clamping to the barrel comprises a

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sleeve 22 having its inner end 23 tapered to correspond to the tapered barrel bore 9 with the outer edge portion of said disk wedged or clamped between said tapers to form a fluid tight joint by the clamping of said sleeve by means of a sleeve clamping nut 24 having a threaded portion 25 engaging the threaded end 8 of the barrel and having a threaded outer end 26 to fit the internally threaded end 27 of a plunger cover cap 28.

The means connecting the inner end of the plunger with the central portion of the diaphragm includes a ball-like member 29 and a plug 31—said diaphragm being clamped between said ball-like member and said plug and also between said ball-like member and the inner flanged end 30 of the plunger.

The filling plunger 21 is a hollow tubular member which is guided in the bores 32 and 33 formed in the sleeve 22 and the nut 24, respectively, with its outer end having an upset connection 34 with a cover plug 35. The spring means for returning said plunger on its suction stroke includes a spring 36 interposed between said plug 35 and a spring seat member 36' which is fixedly secured against longitudinal movement by a key or bar 37 which projects through slots 38 in said plunger and has its ends 39 anchored at 40 in the sleeve 22.

Instead of making the slots 38 straight throughout their length as shown in said Patent No. 1,904,358, said slots are made to have straight portions 42 and offset straight portions 43 to provide locking shoulders 44 and camming or inclined surfaces 45, the straight portion 42 being diametrically disposed while the straight portions are offset diametrically on opposite sides of said plunger from said straight portions 42. The result of this construction is that, with the cap 28 removed, as the plunger 21 is pushed inwardly against the opposing force of the spring 36 from the position shown in Fig. 1 to the position shown in Fig. 2, the key or bar 37 slides in the straight portions 43 until it strikes the inclined surfaces 45 and is then deflected thereby into the straight portions 42. This deflection by the surfaces 45 causes an angular or arcuate movement of the plunger 21 relative to the barrel, so that when the plunger 21 is released and allowed to return under the action of said spring 36, the key bar 37 strikes the oppositely disposed shoulders 44 of the plunger, and the plunger is thus automatically prevented from moving the full length of its stroke, and this action takes place in the ordinary filling operation of the pen, so that at the completion of the several strokes imparted to the plunger by the operator in the filling of the pen, the plunger is held in the partial stroke position shown in Fig. 3.

To permit release of the locked plunger 21 from its partially complete out-stroke position, the cover plug 35 has a polygonal head with rounded corners 46 which are closely fitted to move in a metal sleeve 47 secured in the cover cap 28 and provided with diametrically disposed, inwardly extending detents or projections 48 which, as the operator screws said cap on the barrel nut 24, engage the plug 35 or outer end of the plunger 21 and rotates it in a direction to release the bar 37 from the shoulders 44 whereupon the spring 36 is free to move the plunger 21 outwardly to the end of its suction stroke, thereby moving the diaphragm to its deflated position, shown in Fig. 1, and thereby creating a sufficient void in the reservoir to allow any ink that may have collected

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in the collector 13 to be drawn into the reservoir 12. Thus the overflow ink chamber of the collector 13 is cleared of ink so that it may function as intended and without any special manipulation of the filling mechanism by the operator.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the claims.

I claim:

1. In a fountain pen having a barrel, a reservoir including a displaceable member in said barrel, a cap removably attachable to the rear end of said barrel by relative movement between said cap and barrel and ink feed mechanism including a collector device; a reciprocatory spring returned plunger for operating the displaceable member to draw ink into said reservoir, rotatably releasable latch means holding said plunger in a partially completed return stroke position at the end of the filling operation by the operator, and latch release means on said cap operable by said movement of said cap relative to said barrel to engage and to release said latch means and allow said plunger to complete its return stroke and thereby cause said member to draw ink from said collector device into said reservoir.

2. In a fountain pen having a barrel, a reservoir including a displaceable member in said barrel, a cap removably attachable to the rear end of said barrel by relative movement between said cap and barrel, and ink feed mechanism including a collector device; a reciprocatory spring returned plunger for operating said displaceable member to draw ink into said reservoir and having a stop, a fixed stop to limit the stroke of said plunger to less than full stroke at the end of the filling operation by the operator, angular advance means operable upon a predetermined preliminary depression of said plunger to turn said plunger to bring its stop into engagement with said fixed stop and means on said cap operable by movement of said cap relative to said barrel and engageable with said plunger to turn said plunger to release its stop from said fixed stop and allow it to complete its stroke and thereby cause said member to draw ink from said collector device into said reservoir.

3. In a fountain pen having a barrel, a reservoir including a displaceable member in said barrel, a cap removably attachable to the rear end of said barrel by relative movement between said cap and barrel and ink feed mechanism including a collector device; a reciprocatory spring returned plunger for operating said displaceable member to draw ink into said reservoir, said plunger having a longitudinally extended slotted portion providing offset straight slots, a shoulder and a camming surface, a stop fixed to said barrel and mounted in said slotted portion and operable by reciprocation of said plunger to turn said plunger to engage said shoulder with said stop as said plunger nears the end of its return stroke at the end of the filling operation by the operator, and means on said cap operable by said movement of said cap relative to said barrel to engage said plunger and rotate the same to release said stop from said shoulder and allow said plunger to complete its return stroke and thereby cause said member to draw ink from said collector device into said reservoir.

4. In a fountain pen having a barrel, a reservoir including a displaceable member in said barrel, a cap having threaded engagement with the rear end of said barrel and adapted for movement

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relative to said barrel, and ink feed mechanism including a collector device; a reciprocatory spring returned plunger for operating said displaceable member to draw ink into said reservoir, said plunger having a longitudinally extended slotted portion providing offset straight slots, a shoulder and a camming surface and having a polygonal head at its rear end, a stop fixed to said barrel and mounted in said slotted portion for cooperation with said camming surface to turn said plunger and effect engagement of said shoulder with said stop by reciprocation of said plunger as said plunger nears the end of its return stroke at the end of the filling operation by the operator, and a projection on said cap operable by movement of said cap relative to said barrel to engage said polygonal head to rotate said plunger to release said stop from said shoulder and allow said plunger to complete its return stroke and thereby cause said member to draw ink from said collector device into said reservoir.

5. In a fountain pen having a barrel, a reservoir including a displaceable member in said barrel, a cap removably attachable to the rear end of said barrel by relative movement between

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said cap and barrel, and ink feed mechanism including a collector device; a reciprocatory spring returned plunger for operating the displaceable member to draw ink into said reservoir, a stop to limit the stroke of said plunger to less than full stroke at the end of the filling operation by the operator, means operable by reciprocation of said plunger to turn said plunger in a direction to engage said stop, and means on said cap operable by said movement of said cap relative to said barrel to engage and turn said plunger in the opposite direction to release it from said stop and to allow it to complete its stroke and thereby cause said member to draw ink from said collector device into said reservoir.

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REFERENCES CITED

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

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Number	Name	Date
1,904,358	Dahlberg	Apr. 18, 1933
2,223,541	Baker	Dec. 3, 1940