

Aug. 23, 1960

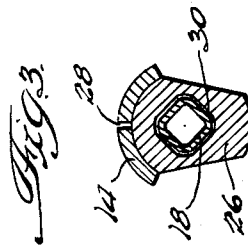
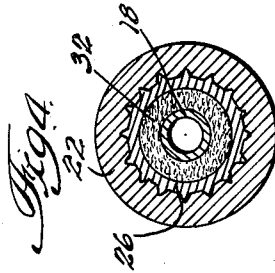
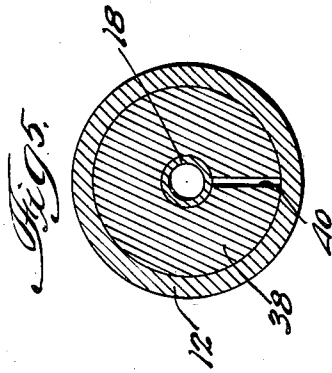
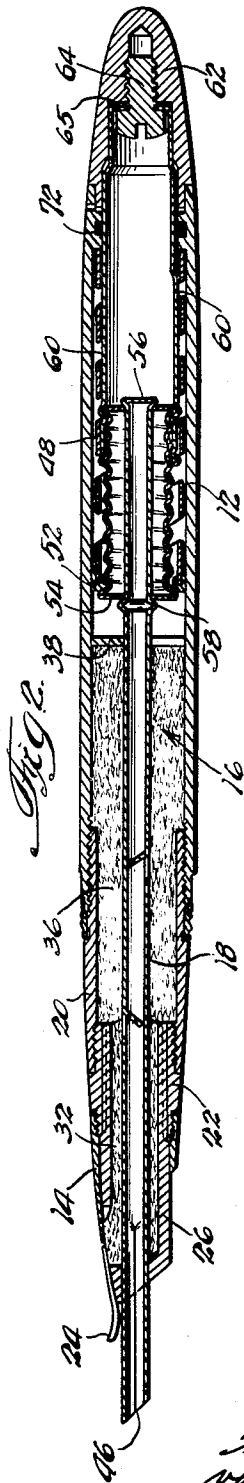
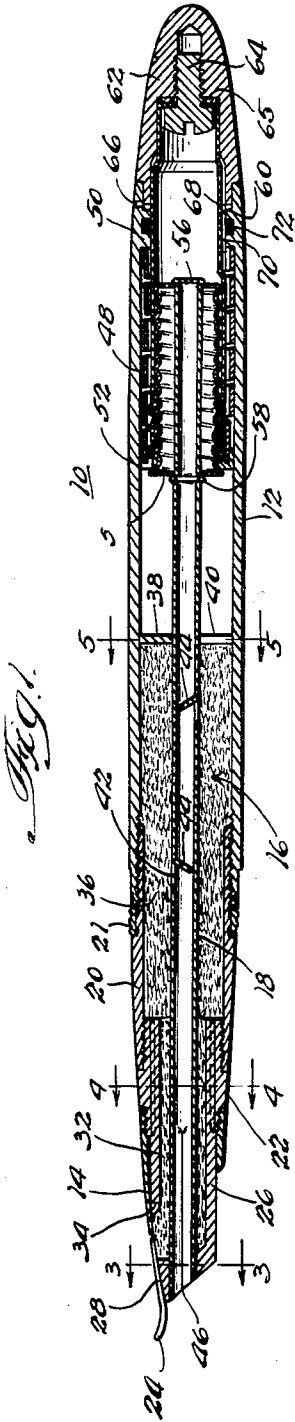
L. P. MARTIN

2,949,888

WRITING IMPLEMENT

Filed Oct. 17, 1955

2 Sheets-Sheet 1



INVENTOR.
Lynn P. Martin.
 BY *Thos. Oba. Mackenbrugg,*
van Holst. & Co. Attys.

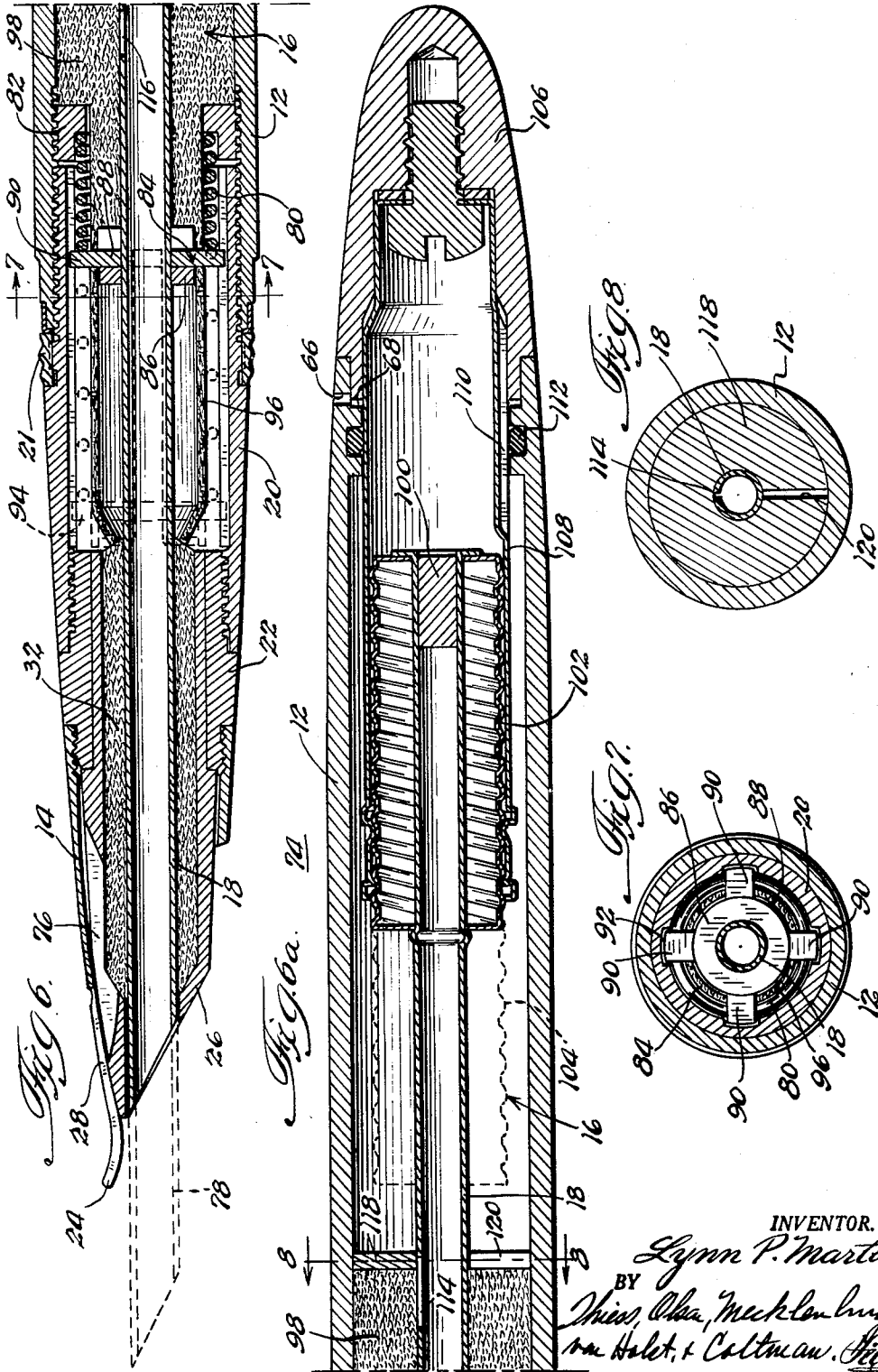
Aug. 23, 1960

L. P. MARTIN
WRITING IMPLEMENT

2,949,888

Filed Oct. 17, 1955

2 Sheets-Sheet 2



INVENTOR.
Lynn P. Martin.
 BY
Miss Anna Mecklenburger,
Att. in Gal. & Col. & Cal. & Ill. & N.Y.

1

2,949,888

WRITING IMPLEMENT

Lynn P. Martin, Fort Madison, Iowa, assignor to W. A. Sheaffer Pen Company, Fort Madison, Iowa, a corporation of Delaware

Filed Oct. 17, 1955, Ser. No. 540,952

10 Claims. (Cl. 120-47)

This invention relates to improved writing implements and more particularly to an improved fluid filling and feeding system for fountain pens. The conventional basic fountain pen comprises a writing element or nib and a flexible sac or other pneumatic reservoir disposed rearwardly thereof for storing fluid to be fed to the writing nib. The reservoir is partially evacuated in some manner to draw writing fluid up through the writing element into the reservoir from which it can be fed back to the nib during writing. Such constructions have exhibited certain characteristics which are undesirable but which have heretofore been considered necessary concomitants of a writing instrument capable of storing fluid. Important among these detriments are the requirement of inserting the entire writing nib into a body of fluid when filling the reservoir, and the dependence of fluid flow upon atmospheric conditions whereby excessive discharge of writing fluid may be experienced with changes in temperature, altitude and the like.

By this invention a fountain pen is provided which may be quickly charged with writing fluid without requiring the immersion of the writing element or gripping section of the fountain pen in a body of fluid. Furthermore, following the filling of the reservoir, fluid flow is substantially independent of variations in atmospheric conditions.

It is an important object of this invention to provide an improved fountain pen which may be quickly charged with fluid during filling and will provide flow to an associated writing element which is substantially independent of external conditions.

It is another object of this invention to provide an improved fountain pen having means for quickly charging a reservoir with fluid without immersion of the writing element or gripping section in a body of fluid.

It is another object of this invention to provide an improved fountain pen having a quickly fillable reservoir functioning substantially independently of atmospheric conditions and variations therein.

It is another object of this invention to provide an improved quickly fillable fountain pen incorporating a capillary reservoir.

It is a still further object of this invention to provide an improved fountain pen utilizing a capillary reservoir and a noncapillary extensible filling tube associated therewith.

It is a still further object of this invention to provide an improved fountain pen having a capillary reservoir and a system whereby said reservoir may be forcefully charged with fluid by partially evacuating the reservoir.

It is a still further object of this invention to provide an improved fountain pen having common means for extending a filling tube forwardly of an associated writing element and forcefully charging a capillary reservoir with fluid.

Further and additional objects of this invention will become manifest from a consideration of this specifica-

2

tion, the accompanying drawings and the appended claims.

In one form of this invention a fountain pen is provided having a writing element and a reservoir containing material defining communicating capillary passages or spaces disposed rearwardly of said writing element. Means is provided for extending a filling tube forwardly of the writing element and for drawing writing fluid up through said filling tube into the capillary reservoir by producing a partial vacuum in the reservoir.

For a more complete understanding of this invention reference will now be made to the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of a fountain pen incorporating one embodiment of this invention;

Fig. 2 is a longitudinal sectional view of the embodiment of Fig. 1 with the filling tube shown in an extended position;

Fig. 3 is a transverse sectional view of the embodiment of Fig. 1 taken on the line 3-3 thereof;

Fig. 4 is another transverse sectional view of the embodiment of Fig. 1 taken on the line 4-4 thereof;

Fig. 5 is still another transverse sectional view of the embodiment of Fig. 1, taken on the line 5-5 thereof;

Fig. 6 is a longitudinal sectional view of the forward half of a fountain pen incorporating a second embodiment of this invention;

Fig. 6a is a longitudinal sectional view of the rearward portion of the embodiment partially illustrated in Fig. 6;

Fig. 7 is a transverse sectional view of the embodiment of Figs. 6 and 6a taken on the line 7-7 of Fig. 6; and

Fig. 8 is a transverse sectional view of the embodiment of Figs. 6 and 6a, taken on the line 8-8 of Fig. 6a.

Referring now to the drawings and more particularly to Fig. 1 a fountain pen 10 is illustrated which comprises basically a barrel 12 having a writing element 14 disposed at the forward end thereof, a reservoir 16 contained therein, and a filling tube 18 longitudinally movable therethrough. A common operating mechanism including manually operable cap 62 is provided for actuating both means for extending and retracting the filling tube 18 and means for partially evacuating the reservoir 16 to produce forceful filling thereof.

The barrel 12 has a gripping section 20 threadedly mounted at the forward end thereof to which a nib supporting collar 22 is in turn threaded. Between the gripping section 20 and support 22 is a small metal collar 21 threaded to receive a conventional point enclosing pen cap. The nib 14 threadedly engages the collar 22 in a conventional manner and is provided with a point 24 having a conventional slit 28 and pierce therein whereby writing fluid will be drawn along said slit 28 by capillary action to said point 24. A feed bar 26 is splined within the collar 22 and cooperates with the nib 14 and the extensible filling tube 18. As shown more clearly in Fig. 3, the feed bar 26 has a rectangular aperture 30 therein through which the filling tube 18 extends. The forward portion of the filling tube 18 has a corresponding rectangular cross section whereby the filling tube is slidable in the feed bar but is secured against rotation about its axis. A central cavity in the feed bar is filled with a capillary mass 32. This capillary mass may be of any material having the desired affinity for writing fluids and defining a plurality of passages, spaces or interstices which are in communication and of capillary dimensions. A transverse opening 34 is provided at the forward end of the feed bar 26 adjacent to the nib 14 whereby the capillary mass 32 is in fluid communication with the pierce and slit 28.

The reservoir 16 is substantially filled with a material 36 similar to the material 32 defining a plurality of com-

3

municating passages of capillary dimensions. The material 36 may be the same as the material 32 which fills the feed bar or may be of a different material provided only that the material 32 defines capillary passages of sufficiently small size and character that writing fluid will be drawn from the reservoir through the material 32 to the nib slit 28. The rearward end of the reservoir is defined by an annulus 38 which has a single radial slit 40 formed therein. This construction is illustrated more clearly in Fig. 5. The slit 40 provides venting of the reservoir during both filling and feeding operations. The annulus 38, reservoir capillary material 36, and feed bar capillary material 32 are provided with a central aperture therethrough through which the filling tube 18 is movable.

The filling tube has a plurality of transverse openings 42 in the area adjacent the reservoir 16 whereby fluid which is drawn upwardly in the filling tube will be drawn into the material 36 contained within the reservoir. Thus charging the reservoir with fluid may be accomplished quickly without drawing the entire fluid charge upwardly through the nib 14 and material 32 contained within the feed bar. Baffles 44 are disposed in the filling tube to deflect a portion of the writing fluid rising therein through the transverse apertures 42, thus further expediting the filling of reservoir 16.

The filling tube 18 is extensible from the writing position illustrated in Fig. 1 to the filling position illustrated in Fig. 2. In the writing position the filling tube 18 remains free of fluid and fluid is fed directly to the writing nib 14 through the feed bar 26. In the extended position illustrated in Fig. 2 the filling tube 18 has an open forward end 46 disposed forwardly of the writing nib 14 whereby the open end may be immersed in a body of writing fluid without contaminating the writing element or the gripping section with fluid. The filling tube 18 is urged to the extended position illustrated in Fig. 2 by a helical flat spring 48 compressed between a shoulder 50 formed in the barrel 12 and a collar 52 secured to a threaded cylinder 54 mounted on the filling tube 18. The threaded cylinder 54 is rigidly secured to the filling tube between the flared end 56 of the filling tube and an expanded shoulder 58 formed in the tube at the forward end of the cylinder. The filling tube is restrained against forward motion in the barrel by a plunger 60 which threadedly engages the cylinder 54 and extends rearwardly into the end cap 62. The plunger 60 is secured in the end cap 62 by a machine screw 64 and washer 65 and the end cap abuts against the barrel 12 restraining the filling tube 18 and plunger 60 against forward motion. It is believed clear from the foregoing description that the filling tube 18 which is secured against rotation in the fountain pen will be axially moved upon rotation of the cap 62. This translation of motion is accomplished by the threaded relationship of the plunger 60 and the cylinder 54.

A small transverse aperture 66 is provided in the barrel 12 and this aperture communicates with an annular recess 68 disposed between the cap 62 and the barrel 12. The purpose of the aperture 66 and recess 68 is to provide continuous venting of the reservoir 16 whereby no effects will be produced in the fountain pen as a result of changes in atmospheric conditions. A short longitudinal depression or recess 70 is formed in the plunger 60 whereby the reservoir is vented past the sealing ring 72.

Referring once again to Fig. 2 it can be seen that as the end cap 62 is rotated the filling tube 18 extends under the force of spring 48 to a position where the forward end of cylinder 54 abuts against the annulus 38. When the filling tube 18 has assumed this forward position further rotation of the end cap 62 disengages the plunger from the cylinder 54. The plunger is then freely reciprocable in the barrel 12 and it is believed clear that rearward reciprocation of the plunger 60 will partially

4

evacuate the reservoir 16, thus drawing fluid upwardly through the open end 46 of filling tube 18 and into the capillary material 36 of the reservoir 16. The longitudinal recess 70 formed in plunger 60 is of relatively short length whereby initial rearward motion of the cap and plunger will render the sealing ring 72 effective. Forward motion of the plunger and cap to their initial positions will not cause any substantial expulsion of writing fluid from the reservoir 16 as a large number of alternate paths are provided through the material 36 and the paths of least resistance for outward air motion will be those which have not been previously charged with writing fluid. Thus, a succession of reciprocations of the plunger 60 will quickly charge the capillary reservoir 16 to its maximum capacity.

Referring now to Figs. 6 and 6a, an alternate embodiment is illustrated having certain features not described above. This fountain pen 74 comprises the same basic elements as the embodiment already described, namely, a barrel 12 having a writing element or nib 14 disposed at the forward end thereof, a reservoir 16 within said barrel, and a filling tube 18 axially movable within the barrel. The gripping section 20 threadedly engages the barrel 12 with a small metal collar 21 disposed therebetween. The metal collar 21 has a threaded outer periphery adapted to receive the conventional fountain pen cap to enclose the writing element 14 and gripping section 20. As already described with respect to the first embodiment, a connecting collar 22 is threaded into the gripping section 20 and the nib 14 threadedly engages the collar 22. A feed bar 26 is forced into the central aperture in the collar 22 and has a capillary mass 32 disposed within a central cavity. A transverse capillary slit 76 is provided in the feed bar 26 whereby writing fluid carried by the capillary mass 32 is transmitted to the slit 28 in the nib 14 and ultimately to the writing point 24.

As in the embodiment described above, the filling tube 18 is reciprocable within the barrel between an extended filling position 78, illustrated in broken lines in Fig. 6, and a retracted writing position illustrated in solid lines. A coil spring 80 is disposed within the reservoir and compressed between a threaded annular insert 82 secured to the barrel 12 and a guide 84 which is rigidly secured to the filling tube 18. As illustrated best in Figs. 6 and 7, the guide 84 comprises an annular portion 88 tightly fitted on the filling tube 18 and carrying four radially extended fingers 90. Forward of the annular portion 88 is mounted a resilient sealing ring 86. The fingers 90 engage longitudinal recesses 92 formed in the gripping section 20 whereby rotation of the filling tube 18 is prevented and the filling tube is guided in its axial movement. The guide 84 moves from the position shown in solid lines to the position 94, shown in broken lines when the filling tube is extended. In the extended position illustrated in broken lines, the collar 86 engages the rearward end of the capillary mass 32 and the rearward end of the feed bar 26 to form a seal whereby air will not freely pass between the mass 32 and the reservoir.

Fluid communication between the reservoir 16 and the capillary mass 32 is provided by a plurality of fingers 96 secured at their rearward ends to capillary material 98 contained within the reservoir. The forward ends of fingers 96 abut against the material 32 in fluid communication therewith but are freely movable whereby extension of the filling tube 18 urges the fingers radially outward to permit the formation of a seal between the collar 86 and the rearward edge of feed bar 26.

As shown in Fig. 6a the mechanism for extending the filling tube 18 and for partially evacuating the reservoir 16 is substantially identical to that described with respect to the embodiment of Fig. 1. A plug 100 closes the rearward end of filling tube 18 to prevent inadvertent accumulation of fluid therebehind and a threaded cylinder 102 is mounted on the filling tube. The cylinder and filling tube are reciprocable between the position

5

shown in solid lines and the position indicated by broken lines 104. This reciprocation is effected by rotating the end cap 106 which has secured thereto the plunger 108, the plunger 108 being in threaded engagement with the cylinder 102. As already described with respect to the embodiment of Fig. 1, when the filling tube is in its extended position, the plunger 108 may be disengaged from the cylinder 102, thereby permitting pure axial movement of the plunger. The reservoir 16 is normally vented to the atmosphere through the aperture 66 in barrel 12 and the recess 68 between the barrel 12 and the end cap 106. A longitudinal depression 110 formed in the plunger 108 connects the venting aperture and recess with the reservoir to by-pass the sealing ring 112. Upon withdrawal of the plunger and cap it will be clear that the sealing ring 112 will become effective as the longitudinal recess 110 moves rearwardly. Thus, as the plunger is withdrawn, the reservoir will be partially evacuated and fluid will rise in the filling tube 18 and pass through transverse apertures 114 and 116 into the capillary material 98 contained within the reservoir. The end annulus 118 seals the rearward end of the capillary material 98 and is provided with a single radial slit 120 for venting the reservoir to the remainder of the barrel cavity. Wherever, in this description, the terms "force filling," "force filling means," "forcefully filled," and the like are employed, it should be clearly understood that some nonatmospheric pressure differential is intended which will force fluid upwardly in a passageway.

While many capillary materials may be employed both in the feed bar and in the reservoir of the disclosed embodiments, the particular material utilized in the construction of fountain pens as described herein was a fine mesh gauze tightly wrapped and completely filling the desired spaces. The wicks or fingers 96 which connect the reservoir with the feed bar in the embodiment of Fig. 6 are preferably of a similar material, although in the event that differing materials are employed the fundamental criterion for the selection of different materials is that the capillary dimensions and characteristics of such materials be so selected that writing fluid will always feed forwardly to areas of increasing capillary force and ultimately to point 24 of the writing element or nib 14. Various fibers, fabrics and comminuted materials have been successfully employed as capillary reservoirs. A plurality of small, tightly packed spheres have been successfully used as well as rolled corrugated material, communicating capillary tubes in side by side relationship, sponge rubber, and the like. All of these are clearly within the scope and intent of the present teaching. Furthermore, applicant teaches the use of a force filling system or pressure system for charging a capillary reservoir with fluid and this may clearly be employed in other embodiments, whether or not they employ the other features of the over-all combination or combinations herein described.

Also, as described herein, the extendable filling tubes are of essentially noncapillary dimensions and it is believed that this facilitates the rapid charging of the capillary reservoir with fluid. However, it should be clear that, if desired, the filling tube may also be filled with material having the necessary capillary characteristics for retaining fluid and filling the reservoir.

Without further elaboration, the foregoing will so fully explain the character of my invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, while retaining certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. A fountain pen comprising an elongate barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel,

6

an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, means for partially evacuating said reservoir, means filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions, and a filling tube of noncapillary dimensions extending between said reservoir and a position forwardly of said barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central position.

2. A fountain pen comprising an elongate barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel, an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, telescoping means in sealing relationship within said reservoir for partially evacuating said reservoir, means filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions extending between said reservoir and a position forwardly of said barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central portion.

3. A fountain pen comprising an elongate barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel, an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, telescoping means in sealing relationship within said reservoir for partially evacuating said reservoir, means filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions, and a filling tube of noncapillary dimensions extending between said reservoir and a position forwardly of said barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central portion, said fluid filling tube being axially reciprocable in said barrel and said reservoir between a retracted position and an extended position in which the forward end of said filling tube extends forwardly of said writing element, the apertures in said filling tube being aligned with said reservoir at least in said extended position.

4. A fountain pen comprising an elongate barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel, an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, means for partially evacuating said reservoir, means

filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions, a filling tube of noncapillary dimensions extending between said reservoir and a position forwardly of said barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central portion, said fluid filling tube being axially reciprocable in said barrel and said reservoir between a retracted position and an extended position in which the forward end of said filling tube extends forwardly of said writing element, the apertures in said filling tube being aligned with said reservoir at least in said extended position, said filling tube being secured against rotation relative to said barrel, means urging said filling tube to the extended position, and cylinder means sealingly and slidingly engaging said barrel, and comprising said means for partially evacuating said reservoir, said filling tube and said cylinder means having correspondingly threaded portions whereby rotation of said cylinder means produces axial motion of said filling tube.

5. A fountain pen comprising an elongate barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel, an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, means for partially evacuating said reservoir, means filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions, a filling tube of noncapillary dimensions extending between said reservoir and a position forwardly of said barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central portion, and fluid baffle means in said filling tube disposed rearwardly of each of the apertures in said filling tube.

6. A fountain pen comprising an elongated barrel, a writing element positioned forwardly of said barrel and radially spaced from the longitudinal axis of said barrel, an elongate fluid reservoir within said barrel rearwardly of said writing element, means defining a capillary fluid path between said writing element and said fluid reservoir, means for partially evacuating said reservoir, means filling said reservoir and subdividing said reservoir into a plurality of communicating passages of capillary dimensions, a filling tube of noncapillary dimensions extending between said reservoir and a position forwardly of said

barrel adjacent said writing element, said filling tube having a substantially straight portion extending forwardly from the forward end of said reservoir generally concentric with and spaced from said writing element, providing a filling passageway isolated from said capillary fluid path, said filling tube further having a coaxial rearward portion extending axially through the central portion of said reservoir and being apertured for fluid communication with said reservoir at a plurality of positions along the axial length of said central portion, said fluid filling tube being axially reciprocable in said barrel between a retracted position and an extended position in which the forward end of said filling tube extends forwardly of said writing element, the apertures in said filling tube being aligned with said reservoir at least in said extended position, fluid baffle means in said filling tube disposed rearwardly of each of the apertures in said filling tube, said filling tube being secured against rotation relative to said barrel, means urging said filling tube to the extended position, and cylinder means sealingly and slidingly engaging said barrel, and comprising said means for partially evacuating said reservoir, said filling tube and said cylinder means having correspondingly threaded portions whereby rotation of said cylinder means produces axial motion of said filling tube.

7. The fountain pen of claim 1 wherein means is provided for isolating the reservoir from the writing element whenever said means for partially evacuating the reservoir is rendered effective.

8. The fountain pen of claim 1 wherein means is provided for displacing said means defining a capillary fluid path whenever said means for partially evacuating the reservoir is rendered effective whereby said reservoir is sealed but for the filling tube.

9. The fountain pen of claim 3 wherein a means is carried by said filling tube for sealing said reservoir from said writing element when said filling tube is in the extended position.

10. The fountain pen of claim 3 wherein said means defining a capillary fluid path is deformable, said fountain pen including means carried by said filling tube for shifting said deformable means and sealing said reservoir from said writing element when said filling tube is in the extended position.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,683	Segre	July 7, 1953
2,496,554	Lynn	Feb. 7, 1950
2,528,408	Zodtner	Oct. 31, 1950
2,610,612	Martin	Sept. 16, 1952
2,640,216	Gottlieb	June 2, 1953
2,642,043	Miessner	June 6, 1953
2,724,366	Miessner	Nov. 22, 1955
2,784,699	Sheaffer	Mar. 12, 1957
2,802,450	Wittnebert	Aug. 13, 1957

FOREIGN PATENTS

20,065	Great Britain	1907
822,691	France	Sept. 27, 1937