

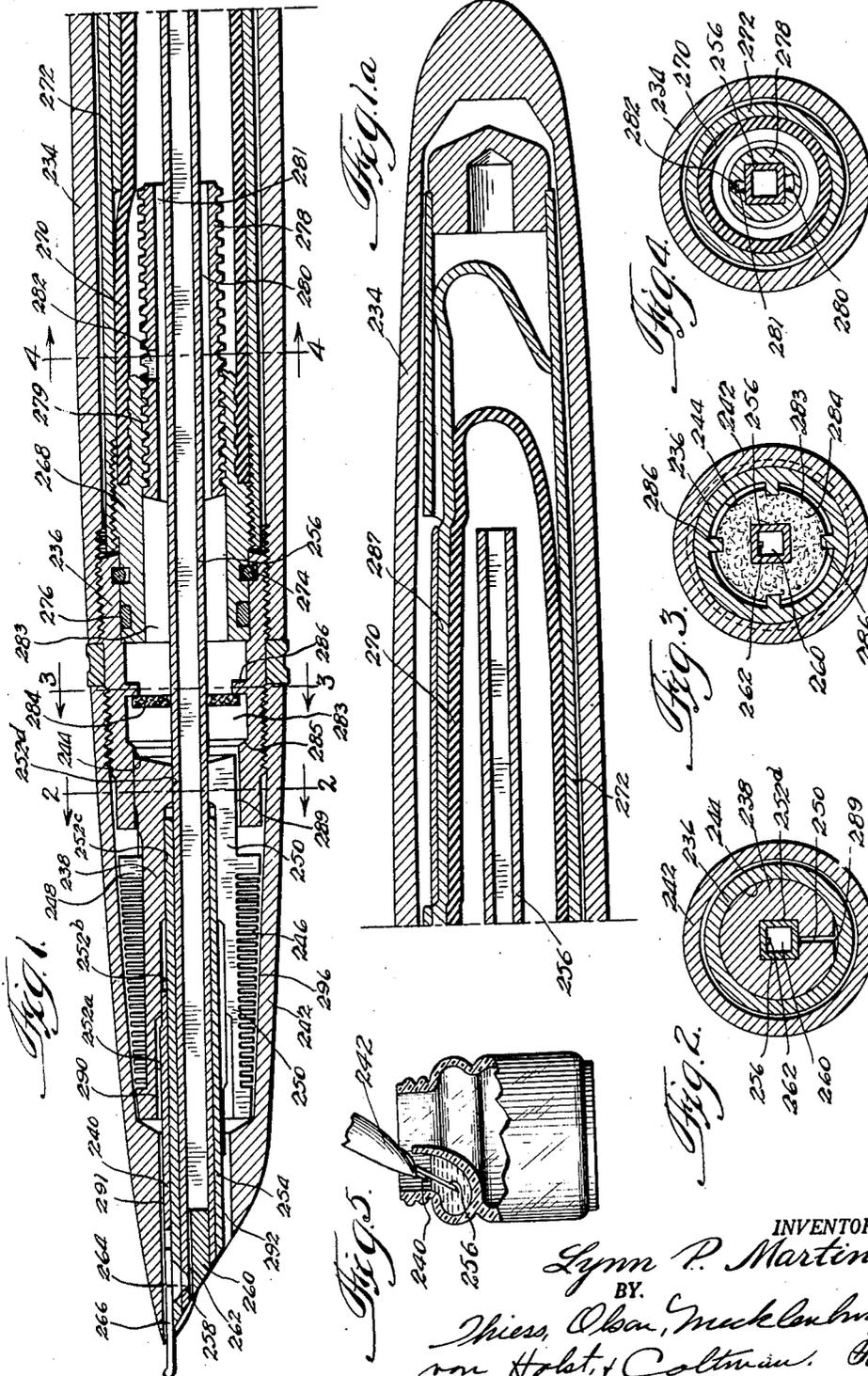
July 16, 1957

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2,799,247

WRITING IMPLEMENTS

Original Filed Nov. 17, 1951



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2,799,247

WRITING IMPLEMENTS

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Original application November 17, 1951, Serial No. 256,897, now Patent No. 2,769,427, dated November 6, 1956. Divided and this application June 1, 1954, Serial No. 433,520

6 Claims. (Cl. 120—47)

This invention relates to writing implements and has for an object the provision of a filling device for a writing implement of the fountain pen type. This application is a division of my co-pending application Serial No. 256,897, filed November 17, 1951, now Patent Number 2,769,427, which in turn is a continuation-in-part of my prior application Serial No. 124,328, filed October 29, 1949 (now abandoned).

In the filling of ordinary fountain pens with a writing fluid, the construction of the pen has ordinarily been such that it is required that the pen nib be completely immersed in a body of the fluid during the filling operation in order to insure that a full charge of fluid will be drawn into the reservoir. Thus when the filling operation is complete, there is usually a substantial amount of residual writing fluid adhering to the pen nib which generally must be wiped off with a cloth or tissue in order to prevent such residual fluid from blotting the paper or coming into contact with the user's hands during a normal writing operation. Also the excess fluid present in the expansion chambers should be removed by blotting in order to permit the expansion chambers to function properly immediately after filling. These problems have long been recognized in the art and various suggestions have been made for their solution. For example, it has in the past been proposed that the manufacturer supply replaceable ready-filled ink cartridges in order to eliminate the necessity for the user to fill the fluid reservoir when the fluid is exhausted. Also it has been proposed to fill the fluid reservoir by a separate means extending through the rear end of the writing implement, thereby avoiding the direct insertion of the writing nib into the writing fluid during a filling operation. However, these proposals have met with little or no commercial success either because of the expense involved in supplying separate cartridges when the instrument is to be refilled, or because of the complications arising from attempting to fill the fluid reservoir by any means other than through the forward writing end.

Accordingly it is one of the objects of this invention to provide a filling device for a fountain pen which may be operated in such a manner that the adherence of excess writing fluid to the nib portion of the pen is eliminated after the filling operation has been completed.

A further object of this invention is the provision of a filling device which eliminates the necessity of wiping excess writing fluid from adjacent the nib of the pen after filling has been completed.

A still further object of this invention is the provision of a filling device for a fountain pen which may be adapted to commercial forms of fountain pens now being manufactured.

A still further object of this invention is the provision of a new type of filling device which requires few parts and which may be readily operated without undue care on the part of the user.

A still further object of this invention is the provision of a filling device for a fountain pen in which the various parts are so arranged that the filling device automatically

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becomes operative during the usual manipulative steps carried out to condition the instrument for the normal filling operation but which device automatically returns to a non-filling or inoperative position when the pen is reconditioned for use after filling.

A still further object of this invention is the provision of a filling device for a fountain pen which is normally concealed and does not interfere with the use of the pen during writing.

Further and additional objects will be apparent from the following description, the accompanying drawings and the appended claims.

In accordance with one embodiment of this invention, the filling device is incorporated into a writing instrument including a fluid reservoir and a writing element mounted forwardly thereof. The filling device itself comprises an elongated tubular member providing communication between the reservoir and an open end of the tubular member adjacent the writing element. The tubular member is longitudinally reciprocable with respect to the main body portion of the instrument so that its open forward end may be manually projected for a substantial distance forwardly of the writing element to a filling position and may be manually retracted to a nonfilling position rearwardly of the writing element. When the tubular member is in the projected or extended position it is dipped into a writing fluid and the fluid is drawn through it to the reservoir in one usual manner commonly employed for filling fountain pens. Thus it is unnecessary to insert the nib itself into the writing fluid during the filling operation. When the tubular member is thereafter reciprocated to the retracted position, the forward end thereof is positioned rearwardly of the tip end of the writing element for a sufficient distance so that it does not interfere during a normal writing operation.

In accordance with one embodiment of this invention the filling tube is reciprocated by a relative turning motion of two coaxial portions whereby the resulting relative rotary motion is transmitted to the filling tube as a longitudinally reciprocating motion. This translation of motion may be likened to the projection of a writing lead in the usual mechanical type pencil wherein the holder constitutes two coaxial parts, one of which is relatively rotatable with respect to the other whereby the relative rotation of the two parts effects a projection or retraction of the pencil lead. The filling tube extends substantially to the rearward end of the associated reservoir (which is the upper end when in the normal position for filling) and thus fluid flows from the filling tube in a series of bursts corresponding to impulses applied to the reservoir to fill the entire reservoir. Feeding of fluid to the writing point is by an alternate path from the forward end of the reservoir. This feed path will be closed when the filling tube is in the extended position whereby a pressure differential may be created in the reservoir to raise the fluid column which is necessary for a normal filling operation.

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

Fig. 1 is a longitudinal sectional view of the forward portion of one embodiment of the present invention;

Fig. 1a is a longitudinal sectional view of the rearward portion of the embodiment shown in Fig. 1;

Figs. 2, 3 and 4 are transverse sectional views of the embodiment of Fig. 1 taken along the lines 2—2, 3—3 and 4—4 respectively; and

Fig. 5 is an elevational view taken partially in section of a bottle of writing fluid and the forward end of a writing instrument showing the manner in which the device of this invention operates during a filling operation.

Referring now to the drawings and more particularly to Figs. 1 and 1a, an embodiment of this invention is il-

illustrated which comprises a barrel 234 threadedly engaged with the rear end of an apertured bushing 236. Ink feed means including a feed bar 238, a pen nib 240 and a protective sheath or gripping section 242 are secured to the forward end of the bushing 236. The bushing 236 is provided with an axial bore 244 into the forward end of which is slip-fitted the rear portion of the feed bar 238 whereby the feed bar is supported. The feed bar is provided with the usual comb cuts and grooves 246 and with a longitudinal scoop cut 248 on the upper surface of the feed bar and a longitudinal fissure 250 on the lower end of the feed bar. The gripping section 242 is threadedly secured to the bushing 236 and provides means for covering the feed bar 238 as well as the rearward portion of the nib 240. The feed bar is provided with an axially extending aperture having a diameter decreasing rearwardly in successive portions 252a, 252b, 252c and 252d, all of which have a substantially square cross section. Also the feed bar includes a sleeve 254 having a square cross section which is tightly slip-fitted into the aperture 252c and is thereby supported in spaced relationship with the walls of the apertures 252a and 252b. The pen nib 240 is firmly secured to the feed bar between the walls of the aperture 252b and the sleeve 254 and extends forwardly in spaced relationship to the gripping section 242.

In accordance with this invention a filling tube 256 having a square cross section throughout its length extends longitudinally of the implement and is capable of being longitudinally reciprocated with respect to the feed bar 238, the nib 240, the gripping section 242 and the sleeve 254. The filling tube 256 passes through the square opening 252d in the rear end of the feed bar and through the square opening in the sleeve 254. By reason of this structure the filling tube is held against rotation with respect to the forward end of the implement. The forward end of the filling tube 256 is provided with a plug 260 which is longitudinally grooved or cut to form a capillary passageway 262 providing an opening in the forward end of the filling tube. This capillary passageway 262 also communicates with a capillary fissure 258 formed in the forward side wall of the filling tube 256, and which later, when the tube is retracted, communicates with a capillary fissure 264 formed in the sleeve 254 and a fluid feeding slit 266 provided in the forward end of the nib 240.

Secured to the rear end of the bushing 236 and mounted for rotation with respect thereto is a reservoir section comprising a collar 268, a fluid sac-type reservoir 270 and a protective sheath 272. The reservoir section is held against longitudinal separation from the bushing 236 by means of a split ring 274 and leakage of fluid between the parts is prevented by a ring gasket 276. The filling tube extends to a position near the rearward end of the sac 270 and a threaded member 278 is firmly secured thereto. The member 278 is threadedly engaged with threads 279 formed within the rearward end of the bore of the collar 268 whereby rotation of the reservoir section with respect to the filling tube results in the longitudinal reciprocation of the tube. The threaded member 278 is formed to provide fluid and air passageways 280, 281 and 282 which communicate the interior of the sac 270 with an annular space 283 formed between the filling tube 256 and the inner walls of the collar 268 and the bushing 236. It will be apparent from the foregoing considerations that rotation in one direction of the reservoir unit comprising the sheath 272, the sac 270 and the collar 268 with respect to the forward end of the implement comprising the bushing 236 and the several parts mounted forwardly thereof will result in the reciprocation of the filling tube 256 whereby the forward end thereof is projected for a substantial distance forwardly of the tip of the nib 240, as shown in Fig. 5. Relative rotation of the elements in the reverse direction will cause the filling tube to retract to the position shown in Figs. 1 and 1a.

A gasket 284 having a square-shaped central opening is frictionally supported on the filling tube 256 within the annular passageway 283 and is movable between a stop shoulder 285 on the bushing 236 and a plurality of spaced lugs 286. Thus when the filling tube is moved forward as above described, the gasket 284 is moved into contact with the shoulder 285 and retains this position until the forward end of the screw member 278 moves up against it, thereby sealing the reservoir 270 to the atmosphere except for the passageway provided by the filling tube 256 and the forward openings 262 and 258. Upon retraction of the filling tube the gasket 284 moves rearwardly to a nonsealing position but is stopped before rearward movement of the tube is complete by the spaced lugs 286 whereby free communication of fluid in the chamber 283 is provided around the gasket 284.

In the operation of the above described device the barrel 234 is first unscrewed and removed from the bushing 236 whereby the casing or sheath 272 is exposed. Thereafter the casing 272, the collar 268 and the sac 270 are axially rotated as a unit with respect to the forward end of the instrument whereby the filling tube is reciprocated to a forward position (not shown). When this movement has been completed the forward surface of the threaded member 278 on the filling tube 256 abuts the gasket 284 which in turn is compressed against the shoulder 285. The extended end of the filling tube is then inserted into a body of writing fluid and a leaf spring 287 accessible through an opening in the sidewall of sheath 272 is alternately depressed and released a number of successive times in order to draw writing fluid up through the filling tube whereby the fluid flows into the main portion of the reservoir defined by the sac 270 and into the space 283 in a plurality of successive spurts until the level of the writing fluid in the sac reaches the top or rearward end of the filling tube 256, it being borne in mind that the axial passageway in the filling tube provides the only means by which the reservoir is communicated with the atmosphere since the forward end of the passageway 283 is sealed by the the gasket 284 urged against the shoulder 285 by the threaded member 278.

After the filling operation has been completed the filling tube is retracted by relatively rotating the casing 272 in the opposite direction with reference to the forward portion of the instrument. When the tube is fully retracted slit 258 comes into registry with slit 264 and the last drop of ink that may be present on the forward end of the tube is immediately taken up by capillary action through the fissure 264 to the slit 266 in the nib 240 whereby the implement is at once primed for writing. Immediately after filling there may be a small quantity of writing fluid left in the filling tube 256 rearwardly of the plug 260. This fluid is used up during writing by passing to the writing point through capillary passageways 262, 258, 264 and 266. In normal operation of the device during writing, fluid flows from the sac reservoir through passageways 282 and/or 281 into the space 283, around the gasket 284 and into the feed bar section through the capillary fissure 250 or a passageway 289 formed by flattening a rear surface of the feed bar as more particularly shown in Fig. 2. The dimensions of passageways 280, 281 and 282 are sufficient to permit fluid flow therethrough. The fluid passes forwardly and from the fissure 250 to an annular passageway 290 between the nib and the feed bar, then to a semiannular passageway 291 between the gripping section 242 and the nib 240, and then to the nib slit 266 and tip in the usual manner. As will be understood, air as required will be vented to the reservoir through a passageway 292 between the sleeve 254 and the gripping member 242, the fissure 250, the passageway 289, the space 283 and the passageway 280 which latter is somewhat larger in cross section than fluid feeding passageway 281.

The function of the temporary ink storage means comprising the comb cuts and grooves 246 and the fissures and cuts 248 and 250 is well understood in the art and pro-

vides means for preventing flooding of the pen in the event that the instrument is subjected to changes in ambient temperature and/or pressure. As will be understood, any ink that may accumulate in the temporary ink storage means will be withdrawn preferentially during the writing operation through the passageways 250, 290 and 291 since there is no need to overcome the capillary forces resisting venting to the reservoir when this situation obtains. The comb cuts and grooves are vented through the scoop cut 248 and the passageways 292 and the annular passageway 296 between the feed bar 238 and the gripping section 242.

It will be noted that the reservoir is not vented during writing through the filling tube 256 due to blocking by the capillary film maintained in fissures 264, 258 and 262. Venting occurs exteriorly of the filling tube as described and, accordingly, a sealing means such as gasket 284 is preferred in this type of construction to insure that fluid will be sucked into the reservoir through the filling tube when the latter is in the extended position. It will be further noted that, if it is desired to flush the reservoir section of the implement, this may be done by immersing the nib in the writing fluid with the filling tube in the retracted position whereby fluid, upon successive pressings of spring 287, is passed through the various venting and feed passageways near the feed bar inasmuch as the gasket 284 is in its rearward position and permits free communication between the reservoir and the nib.

Thus this invention provides a structure in which the pen nib need not be immersed in the writing fluid during the filling operation and the pen nib and feeding means including the feed bar therefore remain clean and free of fluid during filling. Also the expansion chamber is not filled with fluid during the filling operation and it is empty and ready for use without the necessity of wiping it dry with a cloth or blotter after each filling operation. At the same time a last drop of ink adhering to the filling tube serves to prime the feed channels to condition the instrument for writing even though previously dry.

It will be apparent from the foregoing that a filling tube has been provided which may be adapted for use in connection with many types of pens now being marketed commercially. Furthermore, the device is particularly adaptable in a type of structure where relative rotation of several parts of the instrument is normally incident to conditioning it for a filling operation since by this invention this relative axial rotation may readily be employed for extending the filling tube.

While one particular embodiment of this invention is shown above, it will be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. A fountain pen comprising an elongated casing having a removable cover portion and a rear portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a collapsible sac within said casing, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted in said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, and threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said writing

point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway communicating with a forward interior portion of said reservoir and with said feed bar.

2. A fountain pen comprising an elongated casing having a removable cover portion and a rear apertured portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a collapsible sac within said casing manually engageable through an aperture in said rear portion, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted on said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, and threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said writing point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway communicating with a forward interior portion of said reservoir and with said feed bar.

3. A fountain pen comprising an elongated casing having a removable cover portion and a rear portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a collapsible sac within said casing, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted on said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said writing point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway therein communicating with a forward interior portion of said reservoir and with said writing point, and means for sealing said feeding passageway when said filling tube is in the forward position.

4. A fountain pen comprising an elongated casing having a removable cover portion and a rear portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a collapsible sac within said casing, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted on said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said

writing point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway therein communicating with a forward interior portion of said reservoir and with said writing point, and a shiftable sealing means carried by said filling tube to close said feeding passageway when said filling tube is in the forward position.

5. A fountain pen comprising an elongated casing having a removable cover portion and a rear portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a collapsible sac within said casing, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted on said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said writing point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway communicating with a forward interior portion of said reservoir and with said writing point, the forward portion of said tube having a capillary slit connecting the interior of said tube and said writing point, and a shiftable sealing means carried by said filling tube to close said feeding passageway when said filling tube is in the forward position.

6. A fountain pen comprising an elongated casing having a removable cover portion and a rear apertured portion and a forward portion secured together in relatively rotatable relationship, a writing fluid reservoir including a col-

lapsible sac within said casing, and spring means substantially covering the apertured portion of said casing and urged thereagainst, said spring means being engageable with said sac, a gripping section positioned forwardly of said casing, a feed bar including a fluid expansion chamber positioned forwardly of said casing and having a longitudinal bore extending therethrough, a writing element mounted on said feed bar having a writing point positioned forwardly of said bar, a longitudinally reciprocable filling tube mounted within said bore communicating with the rearward interior of said sac and terminating in an open forward end adjacent said writing point, means on said forward portion for holding said filling tube against relative rotation when the rear portion is being rotated relative thereto, threaded means on said tube and said rear portion cooperating to reciprocate the open forward end of said tube with respect to said casing between a filling position forwardly of said writing point and a nonfilling position rearwardly of said point when said forward and rear portions are relatively rotated, said feed bar having a fluid feeding passageway communicating with a forward interior portion of said reservoir and with said writing point, the forward portion of said tube having a capillary slit connecting the interior of said tube and said writing point, and a shiftable sealing means carried by said filling tube to close said feeding passageway when said filling tube is in the forward position.

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