May 12, 1942. R. T. WING 2,282,840

FOUNTAIN PEN

Filed Oct. 3, 1941 2 Sheets-Sheet 1

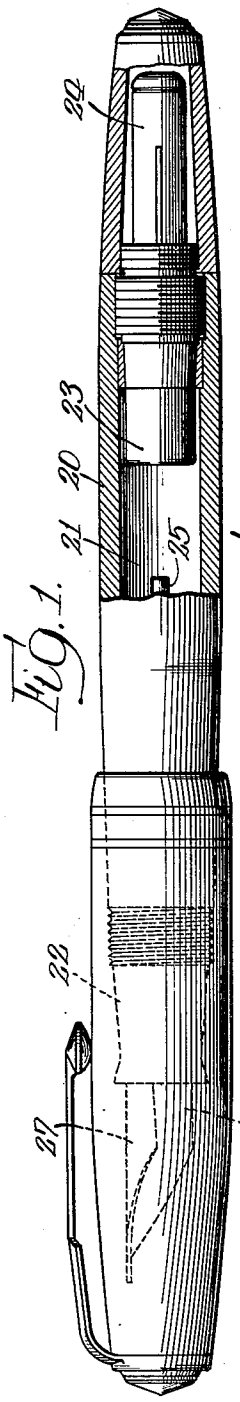

Fig. 1.

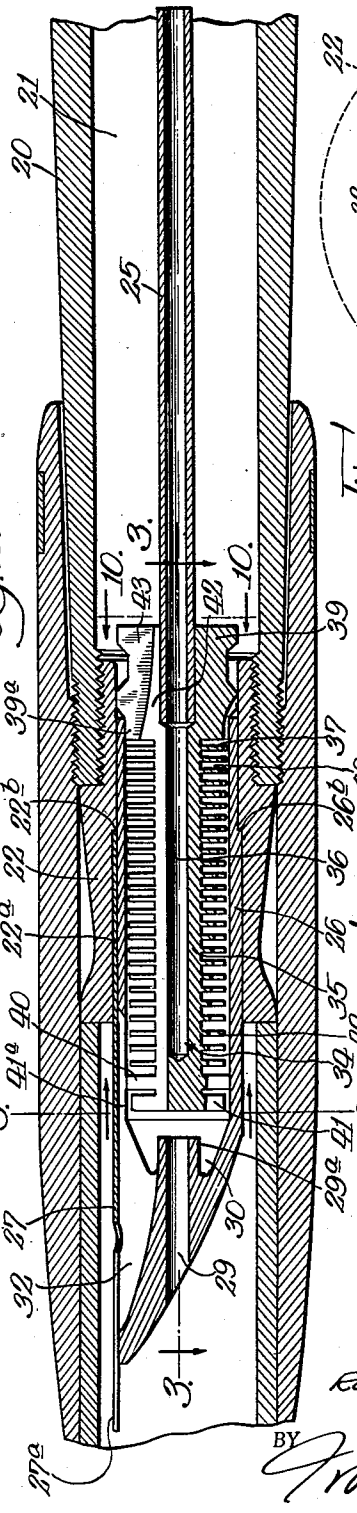

Fig. 2.

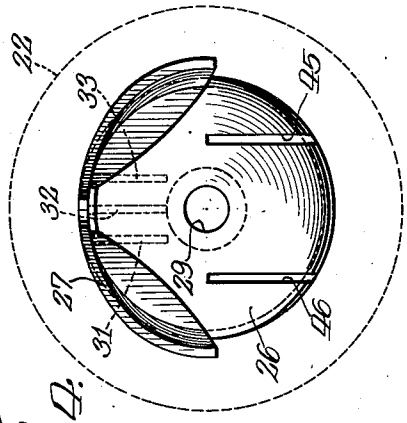

Fig. 4.

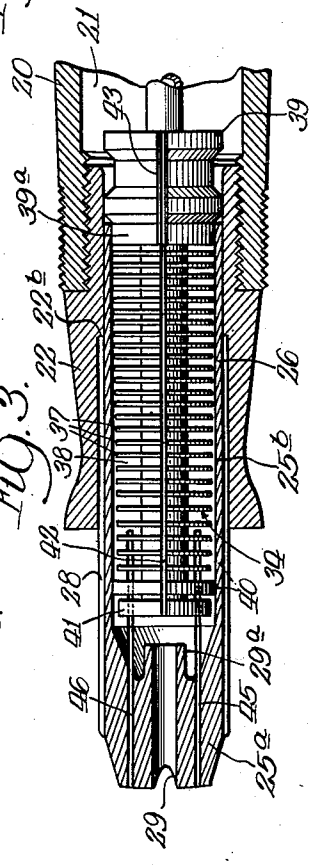

Fig. 3.

RUSSELL T. WING INVENTOR.

BY Frank W. Lefft ATTORNEY

May 12, 1942. R. T. WING 2,282,840

FOUNTAIN PEN

Filed Oct. 3, 1941 2 Sheets-Sheet 2

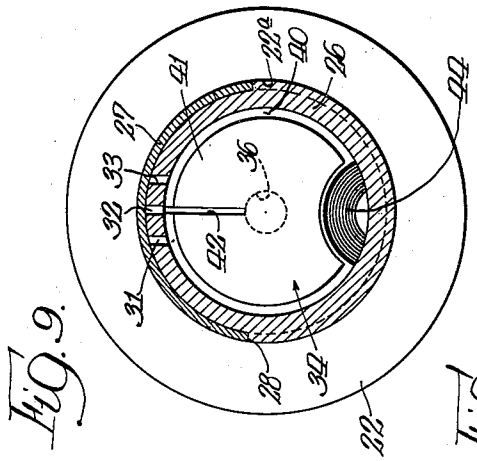

Fig. 9.

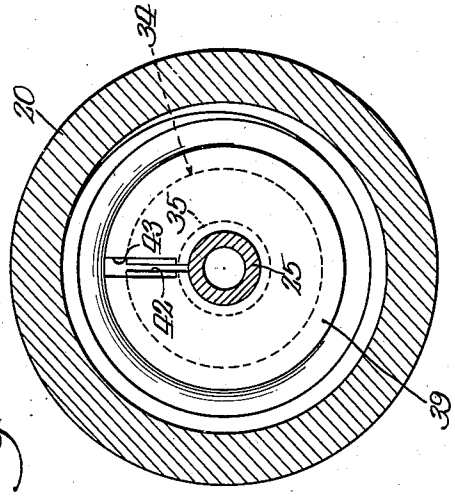

Fig. 10.

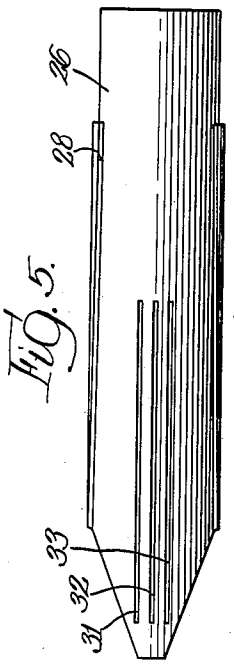

Fig. 5.

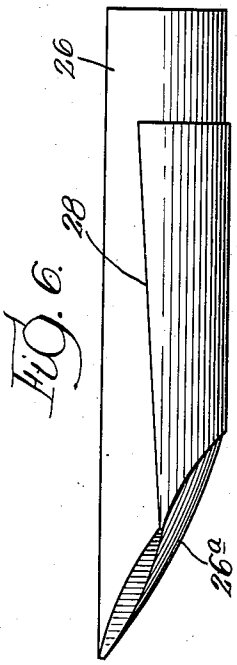

Fig. 6.

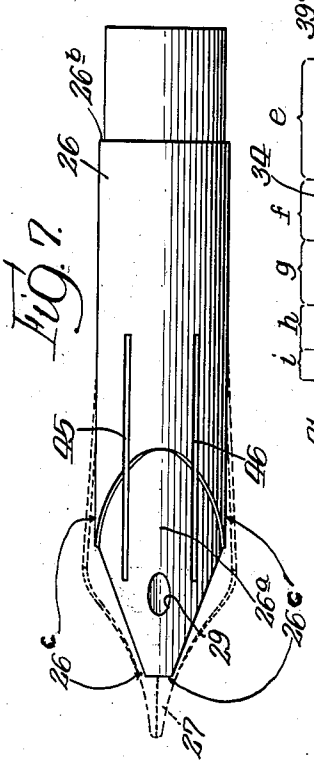

Fig. 7.

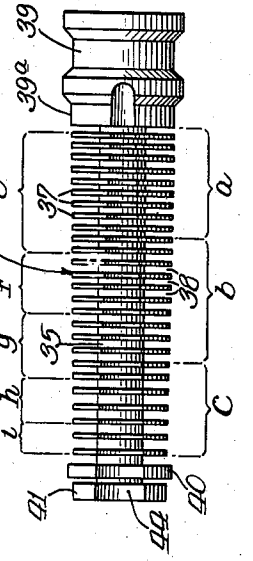

Fig. 8.

RUSSELL T. WING INVENTOR.

BY Frank D. Cuff ATTORNEY

Patented May 12, 1942

2,282,840

UNITED STATES PATENT OFFICE

2,282,840

FOUNTAIN PEN

Russell T. Wing, Excelsior, Minn.

Application October 3, 1941, Serial No. 413,440

33 Claims. (Cl. 120—50)

My invention relates to fountain pens and it has to do particularly with ink feeding mechanism therefor.

One of the objects of my invention is to provide improved ink feeding mechanism for fountain pens which is of simple construction, is inexpensive to manufacture and is adapted to control the feeding of ink in a highly efficient manner.

A further object is to provide improved means for controlling the flow of ink whereby uniform writing performance is assured and tendency toward leakage or ink flooding is practically eliminated.

Another object is to provide improved ink feeding mechanism which includes feed bar structure having a capillary ink feeding channel between the pen nib and an ink reservoir, which channel intersects internal excess ink collecting chambers of capillary form.

A more specific object of my invention is to provide an improved ink feeding mechanism which includes a shell member adapted to be mounted in a pen barrel and having a projecting portion with a longitudinal capillary ink feed fissure therein adapted to support a pen nib, which shell member houses an internal core formed with a cellular ink collector providing a plurality of successive capillary chambers intersected by a capillary feed fissure formed in such core, the arrangement being such that the capillary feed channel of the core communicates with the ink reservoir at one end and with a capillary ink feeding fissure in the shell at the other end.

Further objects are to provide a shell-like feed bar member having therein a plurality of capillary ink feeding fissures for feeding ink to a pen nib externally supported thereon; to provide means by which an external wiping action over the shell causes the emptying of ink from the cellular ink collector of the shell-mounted core; to provide feed mechanism of the type specified which readily lends itself to manufacture from a plastic material; and to provide improved means for locating and supporting the pen nib upon the shell member, which means permits the forming of the shell from a thin plastic material without danger of breakage of the same when the shell and nib are fitted into the pen barrel.

Other objects and advantages will become apparent as this description progresses and by reference to the drawings, wherein—

Figure 1 is an elevational view, partially in section, of one form of fountain pen embodying my invention;

Fig. 2 is an enlarged longitudinal sectional view of the feed mechanism employed in the pen shown in Fig. 1;

Fig. 3 is a longitudinal sectional view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is an enlarged end view of the structure shown in Fig. 3;

Fig. 5 is a separated top plan view of the shell structure shown in Figs. 2 and 3;

Fig. 6 is a side elevational view of the shell of Fig. 5;

Fig. 7 is a bottom plan view of the shell shown in Figs. 5 and 6 and having a pen nib shown in dotted lines in association therewith;

Fig. 8 is a separated bottom plan view of the ink collecting core shown in Figs. 2 and 3;

Fig. 9 is an enlarged sectional view taken substantially on line 9—9 of Fig. 2; and

Fig. 10 is an enlarged section taken substantially on line 10—10 of Fig. 2.

The pen shown in the drawings (Figs. 1, 2 and 3) comprises a barrel 20 having an ink reservoir 21 and a detachable feed supporting section 22 at its forward end. The section 22 is provided with a longitudinal circular opening 22a, the outer portion of which is of greater diameter than the inner portion, providing a shoulder 22b, the purpose of which will become obvious hereinafter. The reservoir 21 is adapted to be filled with ink by filling mechanism of the general character disclosed in Letters Patent No. 1,904,358, granted on April 18, 1933, to Arthur O. Dahlberg. This mechanism includes a flexible diaphragm 23 in the rear end of the barrel which is adapted to be actuated by a reciprocable plunger 24 to effect pressure variations within the reservoir to accomplish its filling. The filling mechanism further includes a so-called breather tube 25 which is carried by the ink feeding mechanism. It is to be understood that while I have illustrated this form of filling mechanism in explaining my invention, I do not wish to be limited thereto because any other desired form of filling mechanism may equally well be employed.

The feeding mechanism, with which my invention is particularly concerned, is supported by the barrel section 22. This mechanism includes a cylindrical shell 26 (Figs. 2, 5, 6 and 7), the forward underportion of which is cut away, as at 26a, for a purpose which will be obvious. This shell is adapted to support a conventional form of pen point or nib 27 (Figs. 2, 4 and 9) which is parti-circular in cross section. Due to

the fact that the width of the shank of the nib increases slightly in forward direction, the longitudinal side edges of the shank portion of the nib are naturally inclined slightly forward and downward (Fig. 1). The nib 27 is centrally supported upon the forward part of the shell and, to insure this positioning of the nib, the upper or nib-saddle surface of the shell is countercut slightly, providing, along opposite sides of the shell, longitudinally extending ledges 28 (Fig. 6) complemental to the longitudinal side edges of the shank portion of the nib. With this arrangement, when the nib is placed upon the shell the side edges of the shank portion thereof seat upon the ledges 23 (Fig. 9) and maintain the nib in a central position. Also, when the nib and shell are assembled in the section 22, the pressure exerted upon the shell by the nib is in a circumferential direction. This permits the use of a thin plastic material for the shell without danger of breakage of the shell when, together with the nib, it is fitted into the section 22. To insure the insertion of the shell 26 within the section 22 to the proper depth, the rear end of the shell is of reduced diameter providing a shoulder 26^b (Fig. 2) which is adapted to abut the pen section shoulder 22^b.

The forward end of the shell 26 is of solid section form (Figs. 2 and 3), while its rear portion is tubular or hollow. The forward end portion of the shell is provided with an axially-directed air opening 29 which connects the tubular or hollow portion of the shell with the atmosphere. The shell material around the inner end of the air opening 29 (Fig. 2) is cut back, as at 30, providing an inwardly extending nozzle-like portion 29^a which tends to prevent the entry of ink into the air opening 29, as will be explained more fully hereinafter. The forward solid section portion of the shell 26 is further provided, in its upper surface, with three capillary ink feeding slits or fissures 31, 32 and 33 which extend from near the forward tip of the shell rearwardly through the solid section portion thereof and into the tubular portion (Figs. 2 and 5). These slits or fissures 31, 32 and 33 are located above the air channel 29 and the cut-back 30 forming the nozzle 29^a provides an edge effect at the inner end of the air opening which tends to prevent ink from such fissures from finding its way by capillary action into the air channel 29.

The tubular portion of the shell 26 is adapted to receive a cylindrical core member 34 (Figs. 2, 3, 8 and 9) which serves as an internal ink feed governor for controlling the flow of ink from the reservoir 21 to the writing point of the pen nib 27. The core member 34 comprises a tubular body portion 35 having a central bore 36 extending from its rear or reservoir end to a point near, but short of, its forward end. The rear end of this bore is slightly enlarged to receive and support the forward end of the breather tube 25. The body portion 35 of the core member is provided with a plurality of external, spaced, circular fins 37, spaced apart to provide therebetween a plurality of capillary chambers or cells 38. The fins 37 are, preferably, spaced apart progressively increasing distances from the rear or reservoir end of the governor member or writing point end as and for reasons more fully explained in my prior Patent No. 2,187,528, granted January 16, 1940.

The diameter of the core fins 37 gradually decreases in forward direction and the diameter of all fins is somewhat less than the inner diameter of the shell 26. Therefore, to centrally support the core within the shell with the peripheries of the fins in such spaced relation, the rear end of the core is provided with a head 39 (Figs. 2, 3 and 8) having an annular bearing portion 39^a adjacent the rearmost fin 37 which snugly fits within the shell 26. The governor member is also provided at its forward end immediately beyond the foremost fin 37 with a circular flange or bearing element 40 which is adapted to snugly fit the shell surface. All of the fins 37 and chambers 38 are disposed between these bearing surfaces.

The extreme forward end of the core is provided with a comparatively wide, circular fin-like member 41, the peripheral surface of which is spaced from the shell surface a capillary distance equal substantially to the width of the shell fissures 31, 32 or 33. This fin 41 provides with the shell 26 a capillary space 41^a between the core 34 and shell 26 which serves as an ink feed connecting means between the core and the shell fissures 31, 32 and 33 across which such space extends. A capillary chamber is also formed between the fin 41 and the flange 40, as will be apparent from Fig. 2.

The governor core 34 is provided, preferably, in its upper side with a longitudinal capillary slit or fissure 42 extending throughout the length thereof and intersecting all of the fins 37, the bearing surfaces 39^a and 40, and the fin 41. The slit 42 is also of sufficient depth to extend through the body 35 of the core member (Fig. 2) into and throughout the length of the bore 36 therein. Thusly, the fissure 42 provides a capillary ink feed channel extending from the reservoir 21 (Figs. 2, 3 and 10) to the capillary space 41^a between the core 34 and the shell 26, which channel is directly connected to each of the capillary collecting chambers 38. The head portion 39 of the governor member is provided with an additional cut or fissure 43 of increased size which is connected with the ink feeding slit 42 and the ink reservoir 21. This latter slit 43 serves as a so-called weir vent and insures the proper control of air flow to the reservoir for the feed of ink therefrom.

The governor member 34 is further provided on its underside with an air channel leading from the rear or innermost end of the core 34 to its outermost end where it connects with the air channel 29 formed in the shell 26. More particularly, this air channel takes the form of a semi-circular cut 44 (Fig. 9) through the peripheries of the fins 37, the land 40 and the fin 41. Such channel is quite shallow at its innermost end and it increases in depth toward the outer end thereof. This form of air channel, together with the spacing of the fins, insures, as explained in my prior Patent No. 2,187,528, the proper filling of the capillary cells outwardly toward the writing point of the pen and also the emptying of such cells from the outermost or writing point end of the governor member toward its inner or reservoir end.

It will be understood that while the width of the weir vent 43 and the feed fissures or slits 42, 41^a and 31, 32 and 33 shall be of capillary dimensions, they may be varied without departing from my invention. I have found that excellent results are obtainable by employing a weir vent 43 of approximately .013" in width, a feed fissure 42 of approximately .005" in width, a capillary space 41^a between the outermost fin 41 and the shell 26 of approximately .005" in width and

shell slits **31**, **32** and **33** of approximately .005'' in width. The slits **31**, **32** and **33**, while preferably of the same width, may, if desired, be of progressively increasing size. The slit **32**, for example, may be .005'', the slit **31** may be .006'' and the slit **33** may be .007''. Good results may be obtained by thus varying the size of such slits because sediment may collect therein restricting the same in some cases as much as .002''. In that case, if sediment should so collect, there will be at least one slit or fissure of at least .005'' in width maintained for proper ink feed. While the nib **27** is closely or snugly fitted upon the shell, there is necessarily provided a very narrow capillary space of approximately .002'' formed at that point and along which the ink finds its way from the fissures **31**, **32** and **33** to the slit **27a** of the pen nib. By centrally locating the nib **27** upon the shell, and by centrally locating the shell feed fissure **32**, the nib slit **27a** and the central shell fissure **32** coincide so that there is a direct flow of ink from the feed channel to the nib and thence to the writing point of the pen. However, if these fissures are somewhat out of alignment the proper conduct of ink to the pen nib is completed by the capillary space between the nib and the shell, the feed taking place through all of the fissures **31**, **32** and **33**.

It is essential in the use of my invention that the core fissure **42** be of less width than the width of the narrowest of the capillary cells **38**. By having this relationship, the edge surface between the feed fissure **42** and the several capillary cells **38** produce an edge effect which prevents the flow of ink into the cells so long as the flow of ink to the writing point through the fissure **42** is normal and that required for writing purposes. This edge effect is, though overcome, and the ink is caused to flow into the cells, as soon as the amount of ink fed toward the writing point begins to exceed that required for the instant writing purposes, as more fully explained in my said Letters Patent No. 2,187,528.

For reasons well understood by those skilled in the art, the distance that the capillary fins are located from the writing point of the pen determines, in part, the width of the capillary cells or chambers **38**. In any particular pen, the farther the chambers **38** are from the writing point, the narrower they should be, according to well-known laws of capillary action, and for that reason, as the chambers approach the writing point and the distance that the column of ink must be supported above the writing point becomes less, the wider the chambers. I have found that another factor which may be of importance in determining the width of these chambers in any particular pen is the pH value of the particular ink employed. The symbol pH, as is well known, is the chemical symbol denoting the negative logarithm of the concentration of the hydrogen ion in gram atoms per liter, used in expressing both acidity and alkalinity. A fluid having a pH value of 6 would mean a concentration of 10^{-6} or 0.000001. As an operative example, with the chambers **38** arranged in groups, I have found that for inks ranging in pH value from approximately 1 to approximately 12 and where the center of the uppermost group of chambers is located approximately $1\frac{3}{32}$'' from the writing point of the pen and the center of the lowermost group of chambers approximately $\frac{49}{64}$'' from such writing point, the chambers may be arranged in three substantially equal groups of, for example, .008'' in width for the uppermost group of chambers indicated at *a* in Fig. 8, .010'' in width for the center group of chambers indicated at *b*, and .012'' for the lowermost group of chambers indicated at *c*, I have further found that in certain instances where the center of the lowermost group of chambers is located closer to the writing point, for example, approximately $\frac{45}{64}$'', where the center of the uppermost group of chambers is located at approximately $1\frac{11}{64}$'' from the writing point, where inks having a pH value ranging from approximately 1 to approximately 8 are used, and where the feed channel sizes above mentioned are employed, excellent results are obtained by dividing the cells into five groups, in which the uppermost group *e* are .013'' in width, the next group *f* are approximately .015'' in width, the next group *g* are approximately .017'' in width, the next group *h* are approximately .020'' in width, and the lowermost group *i* are approximately .023'' in width. It will, therefore, be seen that for inks having a pH value from 1 to 12, chamber sizes ranging from .008'' to .013'' at the rear end of the governor to .12'' to .023'' at the other or forward end of the governor may be employed with good results where the ink feed fissure is approximately .005'' with the center of the lowermost group of chambers located between $\frac{45}{64}$'' and $\frac{49}{64}$'' from the writing point. It will be understood that the foregoing chamber spacings are given as illustrative of spacings demonstrated to give excellent results in the use of my invention and where the capillary feed channel is approximately .005'' in width. I have also found, however, that good results may be obtained with the foregoing chamber spacings and inks having the particular pH values specified, if the feed channel is varied in width, for example, from .004'' to .007''. Within the foregoing conditions, as the pH value of the ink is raised the sizes of the chambers may be reduced somewhat and vice versa. The wettability of the material employed for the shell **26** and core **34**, as well as the surface tension characteristic of the ink, may have some influence on the size of the chambers **38**, but by following the examples above set forth, excellent results may be obtained with all known inks and materials.

Bearing in mind the foregoing, the flow of ink is controlled in accordance with my invention as follows: Assuming that the reservoir **21** is supplied with ink, the ink flows therefrom into and through the capillary feed channel **42** to the forward end of the governor member **34**. It then flows by capillary action outwardly along the slit formed in the wide fin **41** at the forward end of the core **34** and into the capillary space **41a** between the fin **41** and the shell **26**. The fin **41** extends laterally across and in spaced relation to the shell feed fissures **31**, **32** and **33** so that the capillary ink feed space between the shell and the fin **41** is directly connected to those fissures. This being the case, the ink finds its way by capillary action into all three of the shell ink fissures **31**, **32** and **33**. The pen nib **27** is mounted over the shell fissures **31**, **32** and **33**, the central fissure **32** being in direct alignment with the nib slit **27a** so that the ink finds its way from the shell fissure to the pen point directly through the nib slit. Ink also finds its way from the other shell fissures **31** and **33** by capillary action along the space between the shell and the nib to the writing point of the pen in a manner which will be well understood.

The flow of ink along the path just described takes place when the writing point of the pen nib

is in contact with the writing surface and writing is carried on. As ink is drawn from the reservoir, air is admitted through the air channel **29**, thence through the air channel **44**, the capillary chambers, the feed channel **42** and weir vent **43** to the reservoir to compensate for the ink withdrawn and to insure a ready flow of ink in a manner well understood. This action takes place so long as the ink being fed is that required for the existing writing needs. However, should ink in excess of the amount required for writing needs be expelled from the reservoir for any of several well-known reasons, my invention prevents flooding of the ink at the writing point. In such case, the edge effect provided between the forward portion of the shell **26** and the adjacent portion of the nib **27**, indicated generally at **26c** (Fig. 7), acts as a stop or resisting force, which upon excess flow of ink causes a build-up of pressure in the ink feed fissure sufficient to overcome the edge effect offered by the edges of the spaces between the feed channel **42** and the chambers **38**, whereby the excess ink is caused to flow into the chambers **38** instead of to the writing point. Flooding is thereby avoided. The edge seal effected is, of course, less at the narrower chambers and, for that reason, this excess ink will first fill the uppermost or rearmost chambers and will progressively fill the remaining chambers toward the writing end of the pen. As the uppermost chambers are filled, air is expelled therefrom and, since the chambers are filled from the rearmost ones to the outermost ones, the air channel **44** is constantly available, as the chambers are progressively filled, for the discharge of air through the channel **29**; and, reversely, the outermost chambers are first emptied and they progressively empty from the outermost ones toward the rearmost ones.

Furthermore, when flooding takes place and the chambers are filled, it is desirable that no more ink be fed from the reservoir until the flooding ink is either returned to the reservoir or used up by writing. To that end, my governor arrangement is such that, when flooding takes place and the chambers **38** are filled with ink, the flow of air to the reservoir through the path heretofore stated is blocked and, as will be well understood, ink cannot flow from the reservoir. Therefore, for reasons more fully explained in my said prior Patent No. 2,187,528, after the flooding takes place and the chambers become filled or partially filled with ink, if writing occurs at that time the ink used in writing will be fed by capillary action from the chambers into the feed channel **42** and thence to the writing point of the pen along the path above stated until all of the excess ink has been used up from the chambers, at which time air can again enter the reservoir **21** and the normal flow of ink from the reservoir to the writing point will be resumed.

Normally, in the filling of the pen with ink, the chambers may become filled with ink, so that the first ink used in writing will be that carried in the chambers. While this condition does not affect the operation of the pen, it may not be desired by some users and may be avoided at the end of the filling operation by withdrawing the pen from the ink with the plunger **24** held in a depressed condition and then released after the pen is withdrawn from the ink. This action, naturally, creates a suction action within the pen barrel and draws the ink deposited in the chambers during the filling operation into the reservoir. There may also be times when the chambers may become filled or partially filled with ink due to a flooding condition when the pen is not being filled, and in such cases the user may wish to empty the chambers of ink. In that case, and also in case the user does not wish to specially manipulate the pen in filling as above explained, I provide special means for clearing the chambers of ink; more particularly, a pair of spaced slits or fissures **45** and **46** at the forward lower portion of the shell **26**, which slits extend across the capillary space **41a** between the forwardmost fin **41** and the shell. These slits **45** and **46**, therefore, like the slits **31**, **32** and **33** in the top side of the shell **26**, are in capillary connection with the feed channel so that, by wiping a cloth or other suitable object thereover, ink is drawn therethrough. Since the chambers **38** are filled with ink and the ink is fed toward the writing point, such ink will first come from the chambers instead of the reservoir, and it will be seen that by wiping a cloth longitudinally along the slits **45** and **46** when the above condition exists, all of the ink may be wiped out of the chambers **38**, conditioning the pen for normal flow of ink from the reservoir to the pen point.

It is believed that the operation and advantages of my invention will be well understood from the foregoing description. By my invention the advantages set forth in my said prior Patent No. 2,187,528 may be attained in a pen of the ordinary standard feed bar type. The advantages of such construction may be obtained by the use of a simple construction operating in a highly efficient manner.

I claim:

1. In a fountain pen, a barrel having an ink reservoir, ink feed means extending from one end thereof comprising a shell having a portion adapted to support a pen nib, a core housed in said shell, said shell having a capillary fissure therethrough on the pen nib supporting surface thereof and said core having a capillary fissure extending longitudinally thereof and communicating with said reservoir and with said shell fissure, means providing a capillary connection between said shell and core fissures for directing ink from said reservoir to the pen nib, said core also having capillary chambers for holding the ink in excess of that required for supplying said fissures, said core having air passage means for connecting each of said chambers with the atmosphere.

2. In a fountain pen, a barrel in which is disposed an ink reservoir, ink feeding means extending from one end of said barrel which comprises a shell having an upper portion adapted to support a pen nib, a core housed in said shell, said shell having a longitudinal fissure of capillary dimension in its nib-supporting portion and said core having a longitudinal fissure of capillary dimension connecting at one end with the ink reservoir and at its other end with said shell fissure for directing ink from the reservoir to the pen nib, means forming annular capillary chambers disposed peripherally of said core and each directly connected with said core fissure, said chambers being of greater capillary dimension than said core and shell fissures, said core having a channel forming a longitudinal air passage intersecting said chambers, said shell having a passage connecting said channel to the atmosphere.

3. In a fountain pen, a barrel having therein an ink reservoir, means for feeding ink from said

reservoir for writing purposes which comprises a shell having one end fitted in said barrel with its other end projecting therefrom and having a portion adapted to support a pen nib, said shell having at least one capillary fissure in its nib-supporting portion, a core member fitted within said shell and with its forward end disposed beneath said shell fissure and its rear end adjacent said reservoir, said core having a longitudinal capillary fissure extending from said reservoir to said shell fissure and connecting with both, means forming a plurality of capillary chambers around the periphery of said core, each said chamber being intersected by and directly connected to said core fissure, said shell having a passage connecting the interior of said shell with the atmosphere, and said core having a passage intersecting said chambers and connecting each thereof to the atmosphere through said shell passage.

4. In a fountain pen, a barrel having therein an ink reservoir, means for feeding ink from said reservoir for writing purposes which comprises a shell having one end fitted in said barrel with its other end projecting therefrom and having a portion adapted to support a pen nib, said shell having at least one longitudinal capillary fissure in its nib-supporting surface, a core fitted within said shell and extending from said reservoir to said shell fissure, said core having a longitudinal capillary fissure extending from said reservoir to the shell fissure, annular means on the end of said core remote from said reservoir forming a capillary space between said core and shell, said capillary space extending laterally across said shell fissure connecting the latter with said core fissure for the feed of ink from the reservoir to the pin nib, means forming a plurality of capillary chambers around the periphery of said core each intersected by said core fissure so as to be directly connected thereto for receiving ink therefrom when the amount flowing through the core fissure exceeds the amount required for writing purposes, said core having passage means for connecting at least a plurality of said chambers to atmosphere.

5. In a fountain pen, a barrel having therein an ink reservoir, means for feeding ink from said reservoir for writing purposes which comprises a shell having one end fitted in said barrel with its other end projecting therefrom and having a portion adapted to support a pen nib, said shell having a plurality of spaced, longitudinally extending capillary fissures in its nib-supporting surface, a core fitted within said shell and extending from said reservoir to said shell fissures, said core having a longitudinal capillary fissure extending from one to the other of its ends, annular means on the end of said core remote from said reservoir forming a capillary space between said core and shell, said capillary space extending laterally across said shell fissures connecting the latter with said core fissure for the feed of ink from the reservoir to the pen nib, means forming a plurality of capillary chambers around the periphery of said core each intersected by said core fissure so as to be directly connected thereto for receiving ink therefrom when the amount flowing through the core fissure exceeds the amount required for writing purposes, said core having pasage means for connecting each of said chambers to atmosphere.

6. In a fountain pen, a barrel having therein an ink reservoir, means for feeding ink from said reservoir for writing purposes which comprises a shell having one end fitted in said barrel with its other end projecting therefrom and having a portion adapted to support a pen nib, said shell having at least one capillary fissure in its nib-supporting portion, a core member fitted within said shell and having longitudinally spaced elements engaging said shell and supporting said core centrally therein, said core having a longitudinally extending fissure of capillary dimension extending throughout its length and connected with said reservoir at one end, capillary means connecting the other end of said core fissure with said shell fissure, and means forming a plurality of capillary chambers around the periphery of said core between said core support elements and intersected by said core fissure, said core having passage means for connecting each of said chambers with the atmosphere.

7. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding means which comprises a shell mounted in said barrel and having a nib-supporting portion projecting therefrom with a longitudinal fissure of capillary dimension therein, a core mounted in said shell with one end adjacent said reservoir and having at its opposite ends bearing surfaces engaging said shell for supporting the core therein, a plurality of longitudinally spaced fins around the periphery of said core between said bearing surfaces and forming a plurality of capillary chambers, said core having a longitudinal fissure of capillary dimension extending from said reservoir and intersecting said fins, said core fissure at the end remote from said reservoir having capillary connection with said shell fissure, said core having passage means for connecting the capillary chambers in said shell with the atmosphere.

8. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding means which comprises a cylindrical shell mounted in said barrel and having a nib-supporting portion projecting therefrom with a longitudinal fissure of capillary dimension therein, a cylindrical core mounted in said shell with one end adjacent to said reservoir and having at its opposite ends annular bearing surfaces engaging said shell for supporting the core therein, a plurality of longitudinally spaced fins around the periphery of said core between said bearing surfaces and forming a plurality of capillary chambers, said core having a longitudinal fissure of capillary dimension extending from said reservoir and intersecting said bearing surfaces and fins, said core fissure at the end remote from said reservoir having capillary connection with said shell fissure, said core and shell being cooperatively arranged to provide passage means independently of said fissures for connecting the interior of said shell and said chambers with the atmosphere.

9. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding means which comprises a shell mounted in said barrel with a nib supporting portion thereof projecting from said barrel, said nib supporting portion of the shell having a longitudinal capillary fissure therein, a core mounted within said shell and having a central bore therein open at one end and closed at the other, said core having a longitudinally extending capillary fissure cut through into said bore and connecting at one end with said reservoir and at its other end with said shell fissure, fins disposed around said core in longitudinally spaced relation and forming capillary chambers intersected by said core fissure,

said chambers being of slightly greater width than said core and shell fissures.

10. In a fountain pen, a barrel having an ink reservoir, and ink feeding means comprising a cylindrical shell mounted in said barrel and having a nib-supporting portion with a longitudinal capillary fissure therein, a nib mounted on said portion over said shell fissure, a core frictionally fitted in said shell and having a longitudinally extending capillary fissure extending from said reservoir to said shell fissure, a plurality of thin fins around the periphery of said core forming capillary chambers of greater width than said fissures and intersected by said core fissure, a comparatively wide fin around said core forwardly of said thin fins intersected by said core fissure and of reduced diameter forming between it and said shell a capillary space extending across said shell fissure and interconnecting said shell and core fissures, said core having an air channel for supplying air to said reservoir through said capillary chambers and core fissure.

11. In a fountain pen, a barrel having an ink reservoir and means for feeding ink from said reservoir which comprises a shell having one end mounted in said barrel with its other end constituting a nib-supporting portion in which are located a plurality of laterally spaced longitudinally extending capillary fissures, a pen nib mounted on said shell over said fissures, a core mounted in said shell and having its forward end shaped to provide an annular capillary space between the core and shell, said capillary space bridging said shell fissures, said core having a longitudinally extending capillary fissure connecting said reservoir with said space for the flow of ink from said reservoir to said shell fissures, spaced fins on the periphery of said core providing capillary chambers intersected by said core fissure, and of greater width than said core fissure, said core having an air channel for supplying air for admission to said reservoir.

12. In a fountain pen, a barrel having an ink reservoir and means for feeding ink from said reservoir which comprises a shell having one end mounted in said barrel with its other end constituting a nib-supporting portion in which is located a longitudinally extending capillary fissure, a pen nib mounted on said shell over said fissure, a core mounted in said shell and having its forward end shaped to provide an annular capillary space between the core and shell, said capillary space extending laterally across said shell fissure, said core having a longitudinally extending capillary fissure connecting said reservoir with said space for the flow of ink from said reservoir to said shell fissure, spaced fins on the periphery of said core providing capillary chambers intersected by said core fissure, and of greater width than said core fissure, said shell also having a longitudinal slit of capillary dimension at a point opposite said nib and passing over said space in capillary flow connection therewith, said core having an air channel for supplying air for admission to said reservoir.

13. In a fountain pen, a barrel having an ink reservoir and means for feeding ink from said reservoir which comprises a shell having one end mounted in said barrel with its other end constituting a nib-supporting portion in which are located a plurality of laterally spaced longitudinally extending capillary fissures, a pen nib mounted on said shell over said fissures, a core mounted in said shell and having its forward end shaped to provide an annular capillary space between the core and shell bridging said shell fissures, said core having a longitudinally extending capillary fissure connecting said reservoir with said space for the flow of ink from said reservoir to said shell fissures, spaced fins on the periphery of said core providing capillary chambers intersected by said core fissure, and of greater width than said core fissure, said shell having on its underside opposite said first shell fissures other spaced, longitudinally extending fissures of capillary dimensions passing over said space in capillary flow connection therewith, and means for admitting air to said reservoir.

14. In a fountain pen, a barrel having an ink reservoir, and means for feeding ink therefrom which comprises a shell mounted in said barrel and having a projecting portion on which a pen nib is supported, a core within said shell, said core and shell having longitudinal capillary fissures connected by an annular space for conducting ink from said reservoir to the pen nib, means in said core for collecting ink in excess of that required to pass through said fissures for writing purposes, said shell having at least one other capillary fissure opposite its ink feeding fissure and extending longitudinally over said space for ink wipe-out purposes.

15. In a fountain pen, a barrel having an ink reservoir therein and an opening at its forward end, ink feeding means comprising a cylindrical shell of plastic material and a pen nib mounted on the forward end of said shell, the rear end of said shell and nib being force-fitted into said barrel opening and being in communication with said reservoir, said shell having longitudinally extending support elements against which the side edges of said nib seat whereby pressure applied by said nib on said shell when they are fitted in said barrel is exerted in a generally circumferential direction, said feeding means being arranged to feed ink through said shell to said nib from said reservoir.

16. In a fountain pen, a barrel having an ink reservoir therein and an opening at its forward end, ink feeding means comprising a cylindrical shell of plastic material, a parti-circular pen nib mounted on the forward end of said shell, the rear end of said shell and nib being force-fitted into said barrel opening and being in communication with said reservoir, said shell having longitudinally extending ledges on the opposite sides thereof against which the side edges of said nib seat whereby pressure exerted by said nib on said shell when they are fitted in said barrel is exerted in a generally circumferential direction, said ink feeding means being arranged to feed ink through said shell, said shell having a capillary fissure connecting with said ink feed means through which ink is fed to said pen nib.

17. In a fountain pen, a barrel having an ink reservoir, and ink feed means adapted for the feed of ink ranging in pH value from 1 to 12, which comprises a pen nib, a nib-supporting means, means providing a capillary ink channel of from .004 inch to .007 inch in width connecting said reservoir with said nib, and means for collecting ink flowing through said channel in excess of that required for writing purposes which includes a plurality of spaced fins forming chambers intersected by said feed channel, said chambers being arranged in groups with the center of the outermost group of chambers being located from $^{45}/_{64}$ to $^{49}/_{64}$ inch from the writing end of said nib with the center of the innermost group of chambers located from $1^{3}/_{32}$ to $1^{11}/_{64}$

inch from the writing point of said nib, said groups progressively increasing in width from the innermost to the outermost of said groups, with the innermost group ranging from .008 to .013 inch in width and the outermost group ranging from .012 to .023 inch in width.

18. In a fountain pen, a barrel having an ink reservoir, and ink feed means adapted for the feed of ink ranging in pH value from 1 to 12, which comprises a pen nib, nib-supporting means, means providing a capillary ink channel of from .004 to .007 inch in width connecting said reservoir with said nib, and means for collecting ink flowing through said channel in excess of that required for writing purposes which includes a plurality of spaced fins forming chambers intersected by said feed channel, all of said chambers being of greater width than said feed channel, said chambers being arranged in groups with the center of the outermost of said groups being located approximately 49/64 inch from the writing end of said nib and the center of the innermost of said groups being located approximately 1 3/32 inch from the writing end of said nib, said groups varying progressively in width from approximately .008 inch for the innermost group to .012 inch for the outermost group.

19. In a fountain pen, a barrel having an ink reservoir, and ink feed means adapted for the feed of ink ranging in pH value from 1 to 12, which comprises a pen nib, nib-supporting means, means providing a capillary ink channel of from .004 to .007 inch in width connecting said reservoir with said nib, and means for collecting ink flowing through said channel in excess of that required for writing purposes which includes a plurality of spaced fins forming chambers intersected by said feed channel, all of said chambers being of greater width than said feed channel, said chambers being arranged in groups with the center of the outermost of said groups being located approximately 49/64 inch from the writing end of said nib and the center of the innermost of said groups being located approximately 1 3/32 inch from the writing end of said nib, said groups varying progressively in width from approximately .008 inch for the innermost group, .010 inch for the intermediate group, and .012 inch for the outermost group.

20. In a fountain pen, a barrel having an ink reservoir, and ink feed means adapted for the feed of ink ranging in pH value from 1 to 8, which comprises a pen nib, nib-supporting means, means providing a capillary ink channel of from .004 to .007 inch in width connecting said reservoir with said nib, and means for collecting ink flowing through said channel in excess of that required for writing purposes which includes a plurality of spaced fins forming chambers intersected by said feed channel, all of said chambers being of greater width than said feed channel, said chambers being arranged in groups with the center of the outermost of said groups being located approximately 45/64 inch from the writing end of said nib and the center of the innermost of said groups being located approximately 1 11/64 inch from the writing end of said nib, said groups varying progressively in width from .013 inch for the innermost group to .023 inch for the outermost group.

21. In a fountain pen, a barrel having an ink reservoir, and ink feed means adapted for the feed of ink ranging in pH value from 1 to 8, which comprises a pen nib, nib-supporting means, means providing a capillary ink channel of from .004 to .007 inch in width connecting said reservoir with said nib, and means for collecting ink flowing through said channel in excess of that required for writing purposes which includes a plurality of spaced fins forming chambers intersected by said feed channel, all of said chambers being of greater width than said feed channel, said chambers being arranged in groups with the center of the outermost of said groups being located approximately 43/64 inch from the writing end of said nib and the center of the innermost of said groups being located approximately 1 11/64 inch from the writing end of said nib, said groups varying progressively in width, the innermst group being approximately .013 inch, the next approximately .015 inch, the next approximately .017 inch, the next approximately .020 inch, and the outermost approximately .023 inch.

22. In a fountain pen provided with a pen nib and a barrel having an ink reservoir therein; a mechanism for feeding ink from said reservoir to said nib which includes a tubular, shell-like member carried by one end of said barrel and having its forward portion projecting outwardly beyond said end of the barrel, and a governor member mounted within said tubular shell member, said governor member having a longitudinally extending ink feed fissure of capillary dimension communicating with said ink reservoir for feeding ink through said governor member longitudinally of said tubular shell member, a plurality of longitudinally spaced fins forming a part of and extending peripherally around said governor member, said fins being intersected by said feed fissure and at least a number thereof being housed within said tubular shell member, the spaces between said fins providing a plurality of capillary chambers of greater capillary dimension than said feed fissure, said capillary chambers directly communicating with said feed fissure, said governor member being provided with a longitudinally extending air channel intersecting said fins and capillary chambers, said air channel being removed from said ink feed fissure and being blanked at the end thereof nearest to said ink reservoir and open for communication with the atmosphere at its opposite end, whereby said fin-formed chambers interconnecting said air channel and said feed fissure provide communication between the atmosphere and said ink reservoir and regulate the flow of ink from the reservoir through said feed fissure to said pen nib.

23. A feed device for use in a fountain pen for controlling the feed of ink from an ink reservoir in a pen barrel to a pen nib, comprising: a tubular, shell-like member adapted to be carried by one end of a pen barrel and having a forward portion adapted to project outwardly beyond said end of the barrel and provide a support for the pen nib, and a core member mounted in said tubular shell member, said core member comprising a body provided with a flange intermediate its ends normally engaging said shell member, said core body having a set of axially spaced transverse fins projecting therefrom on the inward side of said flange and received within said shell member, the spaces between said fins providing a plurality of capillary chambers, said core body also having a longitudinally extending ink feed fissure of capillary dimension adapted to communicate at one end with the ink reservoir for feeding ink through said core member longitudinally of said shell

member toward the pen nib, said ink feed fissure intersecting said flange, fins and capillary chambers, said capillary chambers communicating with said feed fissure at their points of intersection, said core body having a groove providing a longitudinally extending air channel intersecting said flange, fins and capillary chambers, said air channel being spaced from said ink feed fissure and being blanked at the end thereof adapted to be disposed nearest to the ink reservoir and being open for communication with the atmosphere at its opposite end, whereby all of said capillary chambers interconnect said air channel and feed fissure, and all said capillary chambers are adapted for communication with the atmosphere.

24. In a fountain pen provided with a pen nib and a barrel having an ink reservoir therein; a mechanism for controlling the feed of ink from said reservoir which includes a tubular, shell-like member carried by one end of said barrel and having its forward portion projecting outwardly beyond said end of the barrel and affording a support for the pen nib which overlies it, and a core member mounted in said tubular shell member, said core member comprising a body provided with a flange intermediate its ends normally engaging said shell member, said core body having a set of axially spaced transverse fins projecting therefrom on the inward side of said flange and received within said shell member, the spaces between said fins providing a plurality of capillary chambers, said core body also having a fin and capillary chamber on the outward side of said flange, said core body further being provided with a longitudinally extending ink feed fissure of capillary dimension communicating with said ink reservoir for feeding ink through said core member longitudinally of said shell member, said ink feed fissure intersecting said flange, fins and capillary chambers, said capillary chambers communicating with said feed fissure at their points of intersection, said core body having a groove providing a longitudinally extending air channel intersecting said flange, fins and capillary chambers, said air channel being spaced from said ink feed fissure and being blanked at the end thereof nearest to said ink reservoir and being open for communication with the atmosphere at its opposite end, whereby all of said capillary chambers interconnect said air channel and feed fissure, and all said capillary chambers are adapted for communication with the atmosphere.

25. In a fountain pen provided with a barrel containing an ink reservoir and a pen nib having a slitted writing end portion; means for feeding ink from said reservoir to said writing end portion which includes a shell-like member mounted in the forward end of said barrel and upon which said pen nib is supported, an ink feed governor member having a portion slip-fitted into said shell member, which portion is provided with a longitudinally extending feed fissure of capillary dimension for conducting ink from said ink reservoir toward the writing end portion of said pen nib, said governor member also having a plurality of longitudinally spaced peripheral fins housed in said shell member, said fins being intersected by said feed fissure and being spaced apart to provide a plurality of chambers of capillary dimension greater than the capillary dimension of said feed fissure, said capillary chambers communicating with said feed fissure at the points of intersection of said chambers and feed fissure, said governor member further having a longitudinally extending air breather channel intersecting said fins and capillary chambers but terminating short of said ink reservoir, said breather channel being disposed at a point removed from said feed fissure but being connected to said feed fissure through said capillary chambers, whereby air is admitted to said capillary chambers and, in turn, into said ink reservoir through said feed fissure.

26. In a fountain pen provided with a barrel containing an ink reservoir and a pen nib having a slitted writing end portion; means for feeding ink from said reservoir to said writing end portion which includes a shell-like member mounted in the forward end of said barrel and upon which said pen nib is supported, an ink feed governor member having a portion slip-fitted into said shell member, which portion is provided with an axial bore communicating with said reservoir and terminating short of the outer end of said governor member and a longitudinally extending feed fissure of capillary dimension communicating with said bore for the full length of said bore for conducting ink from said ink reservoir and bore toward the writing end portion of said pen nib, said governor member also having a plurality of longitudinally spaced peripheral fins housed in said shell member, said fins being intersected by said feed fissure and being spaced apart to provide a plurality of chambers of capillary dimension greater than the capillary dimension of said feed fissure, said capillary chambers communicating with said feed fissure at the points of intersection of said chambers and feed fissure, said governor member further having an air breather channel intersecting said fins and capillary chambers but terminating short of said ink reservoir, said breather channel being disposed at a point removed from said feed fissure but being connected to said feed fissure through said capillary chambers.

27. In a fountain pen provided with a barrel containing an ink reservoir and a pen nib having a slitted writing end portion; means for feeding ink from said reservoir to said writing end portion which includes a shell-like member mounted in the forward end of said barrel and upon which said pen nib is supported, an ink feed governor member having a portion slip-fitted into said shell member, which portion is provided with a longitudinally extending feed fissure of capillary dimension for conducting ink from said ink reservoir toward the writing end portion of said pen nib, said governor member also having a plurality of longitudinally spaced peripheral fins housed in said shell member, said fins being intersected by said feed fissure and being spaced apart to provide a plurality of capillary chambers, said capillary chambers communicating with said feed fissure at the points of intersection of said chambers and feed fissure, said governor member further having a longitudinally extending air breather channel intersecting said fins and capillary chambers but terminating short of said ink reservoir, said breather channel being disposed substantially diametrically opposite said feed fissure but being connected to said feed fissure through said capillary chambers, said shell being arranged and constructed to vent said breather channel to the atmosphere, whereby air is admitted to said capillary chambers and, in turn, into said ink reservoir through said feed fissure.

28. In an ink feeding device for a fountain pen, a hollow shell member open at one end and closed at its opposite end by a solid section, said solid section having an air opening extending therethrough defined in part by a nozzle-like portion projecting inwardly from said solid section, said shell member having a capillary ink fissure extending through a side wall thereof and projecting into said solid section, the inner extremity of said nozzle-like portion terminating at such distance from the inner edge portion of said capillary ink fissure as to prevent the entry of ink from said capillary ink fissure into said air opening by capillary action.

29. A feed device for use in a fountain pen for controlling the flow of ink from an ink reservoir in a pen barrel to a pen nib, including: a governor member having a plurality of longitudinally spaced peripheral fins providing a plurality of longitudinally spaced capillary chambers, said governor member being provided with a longitudinally extending feed fissure of capillary dimension intersecting said fins and interconnecting said capillary chambers, said feed fissure being adapted to communicate at one end with an ink reservoir and at its other end with the pen nib, said governor member having a separate air channel intersecting at least a portion of said fins and interconnecting the capillary chambers formed by the intersected fins, one end of said air channel terminating short of one end of said governor member and the other end of said air channel extending toward the opposite end of the governor member for communication with the atmosphere.

30. In a fountain pen provided with a pen nib and a barrel having an ink reservoir therein; feed mechanism for controlling the flow of ink from the reservoir to the pen nib which includes an annular governor member having a plurality of longitudinally spaced fins extending substantially throughout its circumference and defining a plurality of annular chambers of capillary dimension therebetween, said governor member having a longitudinally extending ink feed fissure of capillary dimension intersecting said fins and said governor member also having a longitudinally extending air breather channel located remotely from said ink feed fissure intersecting said fins and adapted to be connected at one end to the atmosphere.

31. In a fountain pen provided with a pen nib and a barrel having an ink reservoir therein; feed mechanism for controlling the flow of ink from the reservoir to the pen nib which includes an annular governor member having a plurality of longitudinally spaced fins extending substantially throughout its circumference and defining a plurality of chambers of capillary dimension therebetween, said governor having a longitudinally extending ink feed fissure of capillary dimension intersecting said fins, and said governor also having a longitudinally extending air breather channel located remotely from said ink feed fissure intersecting said fins and adapted to be connected at one end to the atmosphere, and a shell-like member in which part of said governor member is housed and within which said air channel partially extends, whereby all of said chambers housed within said shell-like member are vented to atmosphere.

32. A feed device for use in a fountain pen for controlling the feed of ink from an ink reservoir in a pen barrel to a pen nib, comprising: a shell member, and a core member, said core member being provided with a plurality of axially spaced transverse fins, said spaced fins having a slip-fit in said shell member and providing a plurality of capillary chambers within said shell member, one of said members being provided with a shoulder and the other of said members having an abutment surface engageable by said shoulder to limit the extent to which said core member can be inserted into said shell member, said core member having a longitudinally extending ink feed fissure of capillary dimension for feeding ink through said core member longitudinally of said shell member, said ink feed fissure intersecting said fins and capillary chambers, and said core member also having an air channel remote from said ink feed fissure, said air channel intersecting said fins and capillary chambers in said shell member, one end of said air channel being blanked and the opposite end of said air channel being open to the atmosphere.

33. A feed device for use in a fountain pen for controlling the feed of ink from an ink reservoir in a pen barrel to a pen nib, comprising: a shell member, and a core member, said core member having a body provided with a set of axially spaced transverse fins, said spaced fins having a slip-fit in said shell member and providing a plurality of capillary chambers within said shell member, said core body having a portion larger in diameter than the fins received in said shell member arranged to abut an end of said shell member to limit the extent to which said core member can be inserted into said shell member, said core body also having a longitudinally extending ink feed fissure of capillary dimension for feeding ink through said core member longitudinally of said shell member, said ink feed fissure intersecting said fins and capillary chambers, said core body further having an air channel remote from said ink feed fissure, said air channel intersecting said fins and capillary chambers in said shell member, one end of said air channel being blanked and the opposite end of said air channel being open to the atmosphere.

RUSSELL T. WING.