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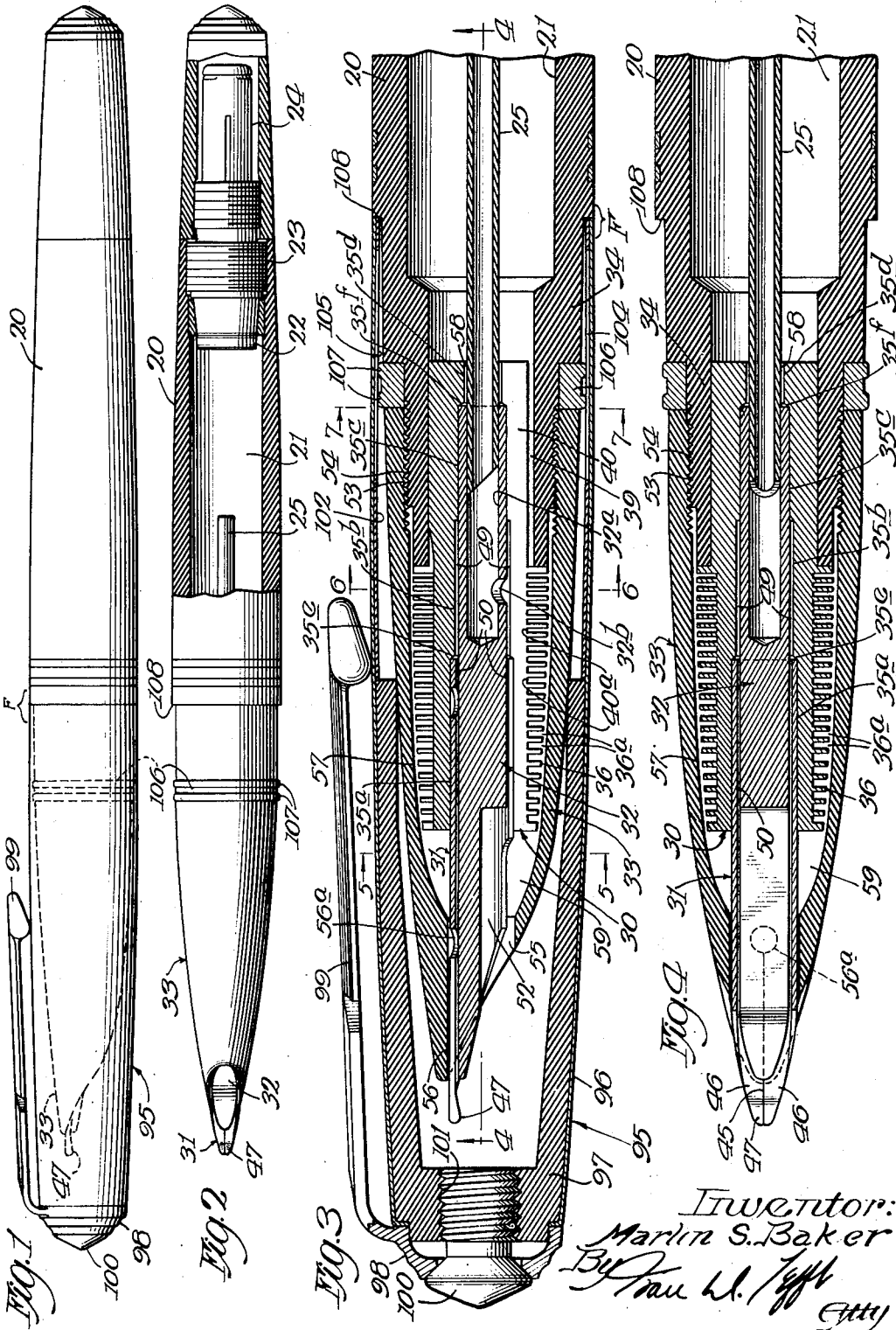
M. S. BAKER

2,223,541

FOUNTAIN PEN

Filed Jan. 6, 1939

3 Sheets-Sheet 1



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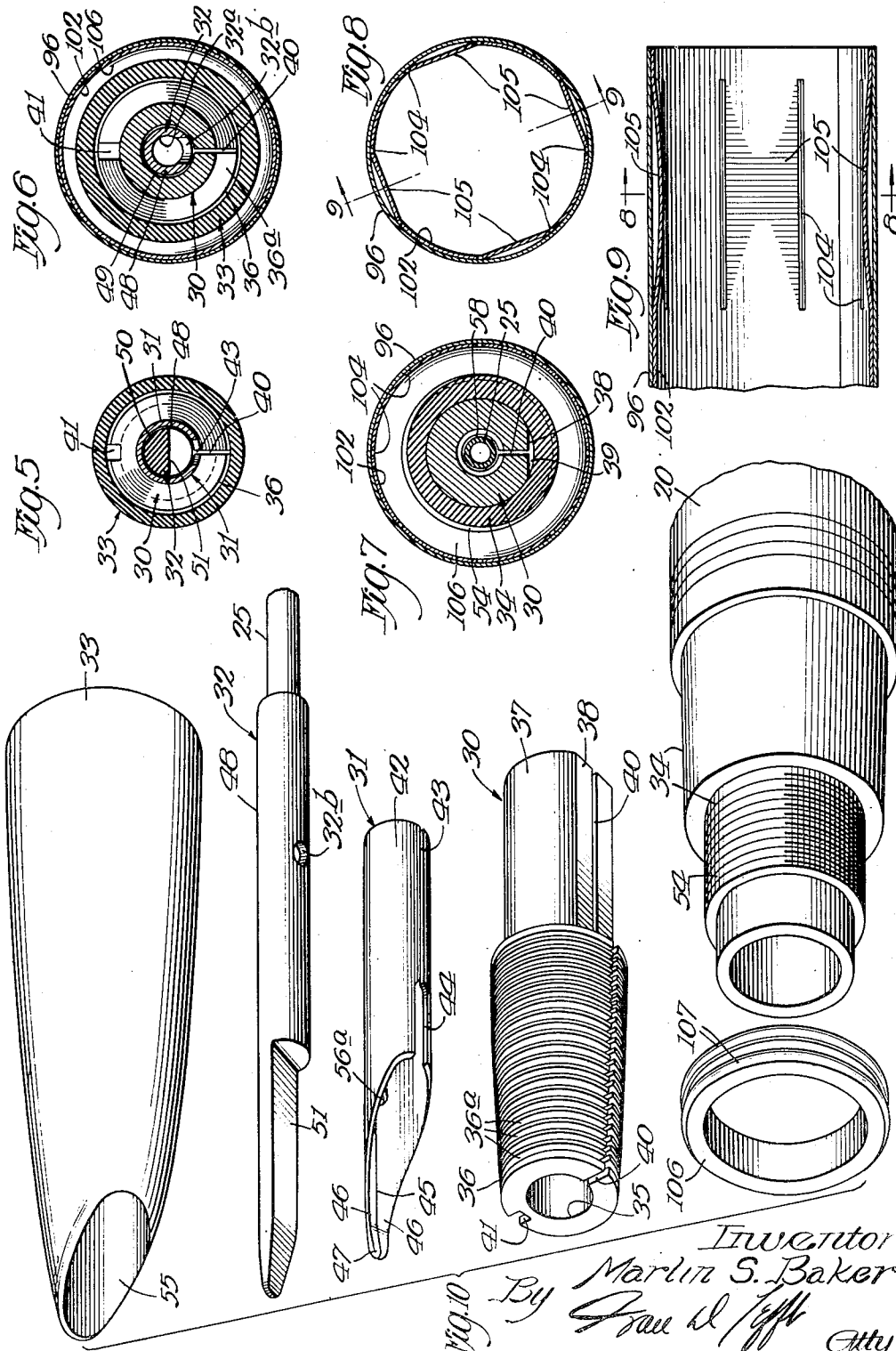
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3 Sheets-Sheet 2



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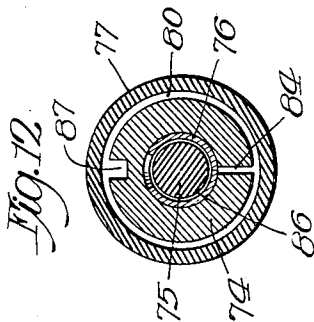
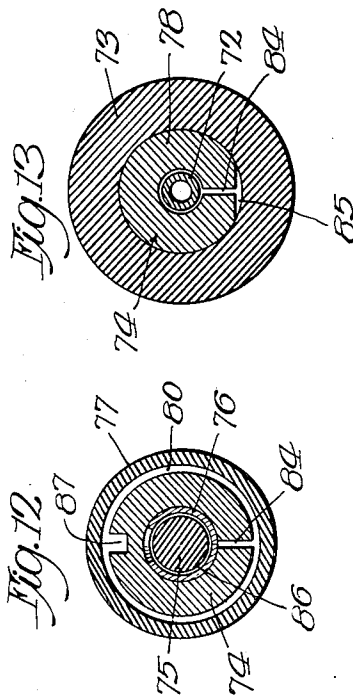
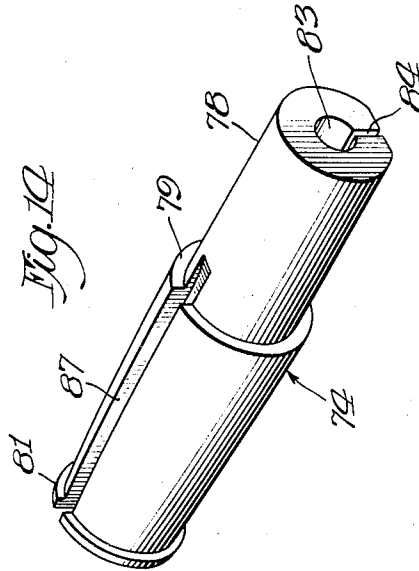
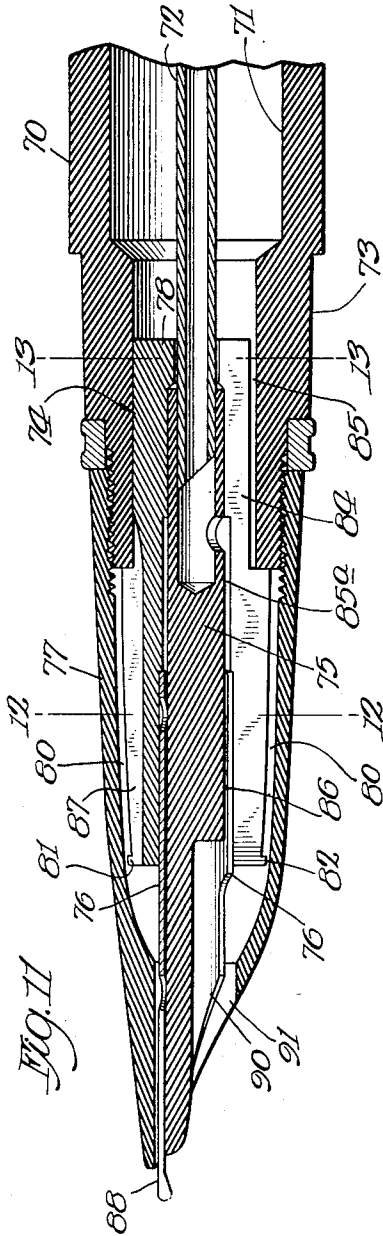
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3 Sheets-Sheet 3



By

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# UNITED STATES PATENT OFFICE

2,223,541

## FOUNTAIN PEN

**Marlin S. Baker, Janesville, Wis., assignor to The Parker Pen Company, Janesville, Wis., a corporation of Wisconsin**

Application January 6, 1939, Serial No. 249,617

37 Claims. (Cl. 120—50)

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

One of the objects of my invention is to provide an improved mechanism for a fountain pen for controlling the flow of ink from a reservoir to the writing end of a pen nib, which mechanism is of simple construction, is inexpensive to manufacture, is stronger and less apt to get out of adjustment than prior ink feed mechanisms, and is adapted to control the flow of ink in a more efficient manner than heretofore attained.

Another object is to provide an ink feed mechanism adapted to control the flow of ink in such a manner that a uniform and smooth writing performance is assured, tendency of ink to leak from the pen at any time is practically eliminated, and tendency for the writing end of the pen to dry out when exposed to the atmosphere is reduced to the minimum.

A further object is to provide a feed mechanism of the foregoing character embodying parts, including a pen nib, that may be readily and quickly assembled and disassembled without danger of injuring or distorting the several parts and, particularly, the pen nib which may be preformed for predetermined writing action.

Still another object is to provide an ink feed mechanism including an ink collector of large capacity for collecting ink discharged from the ink reservoir in excess of that required for writing purposes, which collector is so constructed that it may be made of a breakable material, with a minimum of loss due to breakage during manufacture and assembly.

Another object is to provide a novel feed unit embodying an ink collector enclosing and supporting a feed bar and a pen nib, these parts being so constructed, arranged and assembled that they form improved capillary ink passages for controlling the flow of ink to the writing point of the pen nib and maintain the feed mechanism in a substantially constant wet condition due to capillary ink films whereby the pen is maintained at all times in readiness for instant writing.

A further object is to provide feed mechanism of the foregoing character wherein the ink collector, the pen nib and the feed bar are frictionally fitted together and constitute a self-contained unit adapted to be frictionally fitted in the forward end of a pen barrel in communication with an ink reservoir therein, the arrangement being such that the entire unit, except the extreme writing point end of the pen

nib, is covered by a shell member carried by the pen barrel and adapted to be grasped in close proximity to the writing point end of the pen nib without danger of ink being smeared on the hand of the user.

Still another object is to provide feed mechanism comprising an ink collector internally supporting a pen nib and a feed bar, and further comprising a shell surrounding and covering the ink collector and the writing point end of the pen nib in closely spaced relation thereto and forming a capillary space adapted to be filled with a film of ink providing a seal against the entry of air to the pen nib and feed mechanism, whereby these parts are prevented from drying out and they are maintained in a wetted condition ready for instant writing. This arrangement also serves to block excess flow of ink to the writing point thereby aiding in uniformity of ink flow and ink leakage prevention.

A further object is to provide an improved closure cap for the writing end of the pen, which cap is adapted to be slip-fitted upon the pen barrel where it is yieldably retained, and it is provided with improved means cooperating with the pen barrel for sealing the writing end of the pen from the atmosphere, the arrangement being such that an edge of the cap seals against the pen barrel in such a way that the barrel and cap walls are substantially flush with each other providing a smooth outer surface throughout the length of the pen when the closure cap is in a pen-closing position.

Additional objects are to provide feed mechanism of the foregoing character wherein the ink collector is frictionally or slip-fitted in the forward end of the pen barrel while the shell member is detachably secured to the barrel therearound thereby preventing detachment of the collector and parts carried thereby; to provide an annular ink collector having a plurality of exterior circumferentially extending spaced fins forming circumferential, spaced capillary cells; to provide an ink collector of the foregoing character having a longitudinally extending air escape channel therein and extending through the fins thereof on its upper side, and a longitudinally extending capillary ink channel extending there-through and through the fins thereof on its opposite or lower side; to provide an improved pen nib of tubular form whereby the writing action of a fountain pen is improved; and to provide an improved nib and feed bar assembly adapted to form an annular capillary film of ink for con-

necting the main feed channel with the writing point of the pen.

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

Figure 1 is a side elevational view of one form of fountain pen embodying my invention;

Fig. 2 is a bottom plan view, partially in section, of the structure shown in Fig. 1, the closure cap, illustrated in Fig. 1 as closing the writing end of the pen, being removed;

Fig. 3 is an enlarged, vertical sectional view, taken longitudinally, through the cap and writing end portion of the pen shown in Fig. 1;

Fig. 4 is a section taken substantially on line 4—4 of Fig. 3 with the closure cap removed;

Fig. 5 is a section taken substantially on line 5—5 of Fig. 3;

Fig. 6 is a section taken substantially on line 6—6 of Fig. 3;

Fig. 7 is a section taken substantially on line 7—7 of Fig. 3;

Fig. 8 is a transverse sectional view through the pen cap shown in Figs. 1 and 3, and taken substantially on line 8—8 of Fig. 9;

Fig. 9 is a fragmental longitudinal sectional view of the forward end of the pen cap, taken substantially on line 9—9 of Fig. 8;

Fig. 10 is an assembly view, with parts shown in perspective, of the several parts constituting the feed mechanism shown in Figs. 3-7, inclusive;

Fig. 11 is a longitudinal sectional view through the forward end of a fountain pen embodying a modified form of my invention;

Fig. 12 is a section taken substantially on line 12—12 of Fig. 11;

Fig. 13 is a section taken substantially on line 13—13 of Fig. 11; and

Fig. 14 is a detached perspective view of the ink collector member employed in the structure shown in Figs. 11-13, inclusive.

The structure illustrated in Figs. 1-10, inclusive, comprises a barrel 20 having an ink reservoir 21 connected at its forward end to ink feed mechanism with which my invention is particularly concerned. 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 22 detachably secured at 23 in the rear end of the barrel and adapted to be actuated by a reciprocable plunger 24 to effect the necessary 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 and which is associated therewith in a manner which will be referred to hereinafter. It is to be understood that, while I prefer to employ filling mechanism of the foregoing character, any other desired form of filling mechanism may be employed without departing from my invention.

The feed mechanism, the separate parts of which are clearly shown in Fig. 10, includes an ink collector 30, a tubular pen nib 31, a feed bar 32, an outer shell 33 and a forward integral and reduced barrel extension 34. The ink collector 30 is adapted to embrace and support the tubular nib 31 and feed bar 32, and these parts are adapted to be assembled as a unit in the barrel extension 34 directly in communication with the ink reservoir 21 (Figs. 3 and 4).

The ink collector 30 (Fig. 10) takes the form of

an elongated cylindrical member having a concentric axial opening 35 extending therethrough. The opening 35 (Figs. 3-7 and 10) is provided with variable diameter portions 35<sup>a</sup>, 35<sup>b</sup>, 35<sup>c</sup> and 35<sup>d</sup>, the outer portion 35<sup>a</sup> of which is of largest diameter with the other portions of progressively decreasing diameter. The portions 35<sup>a</sup> and 35<sup>b</sup> form a shoulder 35<sup>e</sup> and the portions 35<sup>c</sup> and 35<sup>d</sup> form a shoulder 35<sup>f</sup> which will be referred to more particularly hereinafter. The forward part of the collector 30 is provided with a plurality of circumferentially extending and axially spaced circular fins 36 which are so formed that they are spaced progressively farther apart from the inner or reservoir end of the collector toward the outer or the writing end of the pen, thereby forming spaced, annular capillary cells 36<sup>a</sup> which progressively increase in width toward the forward end of the pen. This arrangement is of importance in controlling the flow of ink and in assuring a uniform flow of ink for writing purposes without danger of leakage and flooding. The rear portion of the collector 30 takes the form of a smooth shank 37 that is cylindrical except for a flat surface 38 formed on the under side thereof. The shank 37 is adapted to be slip-fitted or friction-fitted in the barrel section 34 and the flat surface 38 thereof provides with the adjacent wall of the barrel section 34 a primary ink feed passage 39.

The collector 30 is further provided throughout its length and on its under side with a narrow slit 40 extending entirely through its wall from its opening 35 through the fins 36. The slit 40 extends centrally through the flat surface 38 of the collector and, being of capillary dimension, provides a secondary feed channel of capillary form extending throughout the length of the collector. Also, the width of the slit channel 40 is less than the width of the narrowest of the capillary cells 36<sup>a</sup> providing an edge seal effect between the capillary cells 36<sup>a</sup> and the feed channel 40, as will be referred to more fully hereinafter. On the upper side of the collector 30, diametrically opposite the slit 40, there is provided an air channel 41 of rectangular shape in cross section, which channel is of greater width than the widest spacing between the fins 36, providing an edge seal effect that will be referred to further hereinafter. The channel 41 extends throughout the length of that part of the collector having the fins 36 and it is of a depth extending from the outer peripheries of the fins 36 to the inner parts thereof. With the foregoing arrangement, each fin-formed capillary space 36<sup>a</sup> is connected to the secondary feed channel 40 and to the air channel 41.

The tubular nib 31 (Figs. 3, 4 and 10) is provided with a cylindrical shank 42 which is split throughout its length on its under side as at 43. The forward lower part of the shank 42 is provided with a U-shaped cut-out 44 which provides an air breather opening, the purpose of which will be more fully explained hereinafter. The forward portion of the tubular nib, which is preferably formed as shown in Fig. 10, is centrally split at the top thereof as at 45, dividing the forward end of the nib into nib sections 46 that may be provided with the usual iridium writing tip 47. The tubular nib may be formed from a flat blank stamped out in such a way as to provide a forward triangular writing end portion which, when the blank is rolled into tubular form, will take the nib shape illustrated in Fig. 10. The nib shank 42 is of such diameter that it fits snugly

within the portion 35<sup>a</sup> of the collector opening 35 where it is frictionally retained in desired writing position. The rear end of the nib shank 42 is adapted to abut the collector opening shoulder 35<sup>e</sup>, which serves to positively determine the position of the nib axially of the collector. A nib of the foregoing character is compact and strong, it is easy to assemble and disassemble, it may be maintained in proper writing condition for a longer time than prior nibs, it may be mounted in such a way that no abnormal strains and stresses are imposed thereon to impair its writing qualities and shorten its useful life, and it may be assembled without damaging preadjustment of the writing nib sections 46 and without requiring after-assembly adjustment to insure proper writing action. The foregoing advantages are secured, in part at least, by the small diameter of the nib which gives it a greater thickness-diameter ratio, thereby providing an improved beam action for the nib sections 46.

The feed bar 32 (Figs. 3-7 and 10) is provided with a cylindrical rear portion 48 of such diameter that it may readily be passed through the tubular nib 31 and snugly fitted in the rear portion 35<sup>c</sup> of the collector opening 35. The collector opening shoulder 35<sup>f</sup> limits the extent to which the feed bar 32 may be inserted axially and inwardly of the collector 30, so that the feed bar is always properly positioned with respect to the nib 31 which is, in turn, positively positioned axially by the collector 30. The cylindrical feed bar portion 48 is of a diameter slightly less than the inside diameter of the tubular nib 31 providing with the latter an annular feed space 50 of capillary form, and it is also smaller than the collector opening portion 35<sup>b</sup> thereby providing with the wall of such opening a slightly wider annular capillary ink feed space 49 (Figs. 3-6) directly connected with the narrower space 50. The lower forward portion of the feed bar is cut away at 51, providing a particular cross section which provides with the forward end of the tubular nib 31 an air space 52 which, as will be explained more fully hereinafter, connects the collector fins 36, feed channels 39, 40 and ink reservoir 21 with the atmosphere through the lower open end portion of the tubular nib. The rear end of the feed bar 32 is provided with a comparatively short axial opening 32<sup>a</sup>, the rear part of which snugly receives the forward end of the breather tube 25 of the filling mechanism. The forward part of the opening 35<sup>a</sup> is connected to the capillary space 49 and, in turn, to the secondary feed channel or slit 40 and fins 36 by a small opening 32<sup>b</sup> on the under side of the feed bar. The extreme rear end portion 35<sup>d</sup> of the collector opening 35 is of slightly larger diameter than the breather tube 25, providing around the latter a capillary space 58 connecting with the collecting slit 40. This space 58 acts in conjunction with the feed channel 40 in starting ink flow when the pen is suddenly moved into a writing position. It also appears that it aids somewhat in controlling the admission of air to the reservoir 21.

In assembling the feed mechanism, I first, preferably, insert the feed bar 32 fully within the collector 30 until its rear end strikes the collector opening shoulder 35<sup>f</sup>. I then insert the tubular nib 31, the same being pressed inwardly until its rear end strikes the collector opening shoulder 35<sup>e</sup>. The rear cylindrical portion 37 of the assembled collector unit is then pressed into the forward barrel section 34 and, as this action takes place, the fit of the parts is tightened somewhat

so that all of the parts of the unit are firmly gripped together and retained in assembled position in the barrel. The longitudinal slitting of the collector 30 and also the tubular nib 31 facilitates this action somewhat, and the feed bar, being unslitted, predetermines the extent of radial contraction of the collector so that the feed passage formed by the slit 40 is maintained at a substantially predetermined capillary width.

The assembled collector unit is covered and substantially fully concealed by the outer shell 33, which plays a part in accomplishing the ink feed control features hereinabove referred to, as well as serving as an extension of the barrel which may be grasped by the user at any position therealong without danger of smearing ink on the hand of the user.

The shell 33 (Figs. 3, 4 and 10) is of circular form and it is provided at its rear end with an internally threaded portion 53 which is adapted to be screwed upon the exterior reduced threaded portion 54 of the forward barrel extension 34. It tapers forwardly from its rear threaded part 53 and, at its forward part, is provided with a tapered nose-like portion having an opening 55 extending diagonally inward along its under tapered side from its forward end portion. The shell 33 is of such length that when it is attached to the barrel its forward top portion terminates at the forward end of the feed bar 32 and its opening 55 coincides with the tapered opening at the forward end of the tubular nib 31. In this way, only the writing tip portion 47 of the nib is exposed and the forward top part of the shell 33, which is shaped complementally to the adjacent top portion of the nib, covers the forward, slitted top portion of the nib 31 in slightly spaced relation, providing a very narrow capillary space 56 between the shell and the adjacent nib surface. The space 56 provides additional means aiding in uniformity of ink flow and in preventing flooding of the pen, and it is connected to the space 50 around the feed bar 32 by an opening 56<sup>a</sup> which is disposed at and in communication with the inner end of the nib slit 45. In conformity with its outer tapered shape, the inner wall 57 of the shell 33 is tapered and the fins 36 of the collector are gradually reduced in diameter accordingly so that the peripheries of the several fins are spaced substantially the same distance from the shell 33 at all points throughout the length of the collector.

In the operation of the structure so far described, the barrel 21 is filled with ink by reciprocating the filling plunger 24. On the down stroke of the plunger 24, air is displaced from the reservoir through the breather tube 25, feed bar vent 32<sup>b</sup>, collector feed channel 40 and opening 52 at the forward end of the feed bar 32. On the return stroke of the plunger 24, a suction action is produced thereby drawing ink into the reservoir mainly through the feed channels 40 and 39. Repeated reciprocation of the plunger 24 fills the reservoir 21 with ink, as more fully explained in the above-identified Dahlberg patent. Some ink may find its way into the reservoir through the feed bar opening 32<sup>a</sup> and the breather tube 25, but the parts are, preferably, so arranged and balanced that practically all of the ink enters the reservoir 21 during the filling operation by way of the feed channels 40 and 39.

During the filling operation, there is a tendency for ink to collect in the capillary cells 36

of the collector 30; however, these capillary cells may be substantially emptied during the final filling operation by removing the pen from the ink before completing the last stroke of the plunger. The capillary cells are kept substantially clean due to the passage of ink there-through during the filling operation so that they constantly perform their intended functions in a highly efficient manner.

10 During the ink feeding operation, ink finds its way into the primary feed channel 39 and thence to the writing point 47 of the nib 31 by way of the secondary collector feed channel 40 and the annular capillary spaces 49 and 50. Ink from the space 50 enters the capillary nib slit 45 and finds its way therealong to the writing point 46. Ink also finds its way through the nib opening 56<sup>a</sup> and fills the space 56 with a fine capillary film of ink. In this manner a substantial, annular and parti-annular capillary film of ink connects the feed channel 40 with the writing point and the feed mechanism is maintained in such a wet condition that it is at all times ready for instant writing.

25 When the pen is tilted to a writing position, ink tends to flow through capillary action, and ink is released from the reservoir 21 for writing purposes by admitting air to the reservoir as ink is used therefrom. Air return to the reservoir 21 is provided for by way of the nib space 52, collector capillary cells 36<sup>a</sup>, feed channels 40 and 39 and breather tube 25. Therefore, if the collector cells 36<sup>a</sup> contain ink at the time the pen is positioned for writing, the return of air to the reservoir 21 and, in turn, the feeding of ink therefrom, is effectually blocked by the un-cleared air-return spaces. As the writing action is carried on under these conditions, ink is supplied for writing purposes first from the capillary cells 36<sup>a</sup> which are directly connected to the feed channel 40. As soon as the capillary cells 36<sup>a</sup> have been emptied, continued writing and use of ink at the writing point, and withdrawal of ink from the reservoir 21, creates a partial vacuum in the reservoir with the result that air passes through the capillary cells 36<sup>a</sup> and feed channels and rises into the reservoir in the form of bubbles, thereby releasing ink for feed to the writing point. The capillary passages and spaces, including the capillary space 58 between the breather tube 25 and the collector 30, through which the air must pass to the reservoir 21 exert a regulatory action on the flow of air (which is in the form of bubbles), thereby exercising a regulatory effect on the flow of ink to the nib point.

Normally, the main feed channels 39 and 40 are at all times substantially filled with ink. Since the channel 40 and the cells 36<sup>a</sup> are of capillary form and the channel 40 is of less width than the narrowest of the cells 36<sup>a</sup>, an edge block or seal condition is established at points 40<sup>a</sup> (Fig. 3) between the feed channel 40 and the cells 36<sup>a</sup>, as will be well understood by those skilled in the art, thereby preventing ink from entering the cells 36<sup>a</sup> except when the flow of ink tends to exceed that amount required for and being used in writing or except when there is a tendency toward a flooding condition. When such edge seal is broken by ink in excess of that normally required for writing finding its way into the feed channel 40, the excess ink flows into the capillary cells 36<sup>a</sup>. This action may happen under various conditions of use and non-use of the pen, e. g., due to the expansion of air in the

reservoir 21 due to the heat of the user's hand, varied atmospheric temperatures and pressures, etc. If the condition existing in the reservoir 21 to cause the flowing out of the ink eventually results in a contraction action or partial vacuum within the same, then the excessive ink previously deposited in the capillary cells 36<sup>a</sup> is drawn back from the capillaries into the reservoir through the ink passages 40 and 39.

It will, therefore, be seen that the collector 10 exercises a direct control over the flow of ink to the pen point for writing purposes. So long as the ink flow is such that it does not exceed the normal capacity of the feed channel 40, air is supplied to the barrel for release of ink for writing purposes, and this ink flow through the extensive capillary space provided around the feed bar between the collector 30 and the nib 31 is sufficient to insure a smooth and uniform writing action. However, just as soon as the ink flow from the reservoir 21 exceeds the capacity of the ink channel 40, it begins to fill the capillary cells 36<sup>a</sup> and thereby blocks off the entry of air into the reservoir, in turn, cutting off the feed of ink from the reservoir to the writing point—the excess ink, as above explained, under initial operation after filling—being first used up from the capillary cells 36<sup>a</sup> before again using ink from the reservoir 21. The capillary cells 36<sup>a</sup> are exhausted only by using up ink at the writing point and through the capillary pull exerted thereon through the capillary passage connecting the cells 36<sup>a</sup> with the writing point. Therefore, at no time can the ink flood at the writing point, and only a capillary amount of ink is released at the writing point as the writing action is carried on so that a uniform rate of flow and uniform writing action is assured.

The foregoing control action by the capillary cells 36<sup>a</sup> is assured by the progressive increase in size of such cells toward the pen point. Through this spacing arrangement, the capillary action is so balanced in all of the cells 36<sup>a</sup> that there is obtained a capillary retaining lift that is in correct proportion to the distance that excess ink is held above the writing point, there is provided a regular and consecutively graduated filling of the collector cells 36<sup>a</sup> from the rear end of the collector 30 toward the forward end thereof when there is excess ink to be collected, and there is obtained a regular and consecutively graduated discharge or drain-back of ink from the cells 36<sup>a</sup> from the forward end of the collector 30 toward the rear end thereof under abnormal flow conditions when the pen is not in use. In the use of the foregoing arrangement, and in case excess ink flow is to be taken care of, the rear-most capillary cell 36<sup>a</sup> fills first with a progressive outward filling of the other cells, and the emptying of the cells 36<sup>a</sup> takes place in a reverse order, namely, from the outermost and larger cells toward the innermost and smaller ones. This arrangement positively prevents the admission of air to the reservoir 21 until all the cells are emptied of ink, otherwise a condition of leakage would tend to exist.

The progressive filling and emptying of the cells 36<sup>a</sup> are aided by the air channel 41 in the upper portion of the collector 30. Air must be positively released from the cells 36<sup>a</sup>, otherwise the cells would not take up the excess ink and the excess flow would be forced out at the pen point with consequent leakage disadvantages. It will be noted that the ink is admitted to the cells 36<sup>a</sup> at the bottom thereof and the ink tends to

climb or fill upwardly therein by capillary attraction. As this action takes place, air is displaced from the cells and this displacement action is naturally an upward one due to the natural tendency of the air to rise. Each capillary cell is connected to the air channel 41 at the top to facilitate this natural air rising and escaping action. The ink continues to rise in the cells 36<sup>a</sup> until the channel 41 is reached, at which time the filling of the cells ceases and ink does not enter the channel 41 due to the edge seal or block provided by the fin edge surfaces which are in all instances spaced apart a less distance than the width of the air channel 41. In this way, there is always the tendency for the air channel 41 to remain open and unfilled with ink so that the cells 36<sup>a</sup> are always connected directly to atmosphere through such channel, the shell space 50 forwardly of the collector and the nib space 52. This arrangement tends to prevent ink jumping, so to speak, across the air channel 41 at some forward part of the collector which, if it should happen, would prevent the rear capillary cells 36<sup>a</sup> from filling properly with consequent leakage at the writing point. Also, by providing the ink connections between the feed channels and the capillary cells 36<sup>a</sup> at the bottom of the feed mechanism and the air release channel at the top, the edge seal action between the capillary cells and the air release channel is improved and the proper operation of the collector 30 at all times is practically assured by the proper and complete filling of the cells 36<sup>a</sup> at all times required to handle excess ink. The attainment of the foregoing features is facilitated by employing an external collector 30 enclosing a nib 31 of tubular form.

It will be seen from the foregoing that the structure embodying my invention affords many advantages. By employing an ink collector 30 having capillary cells extending exteriorly therearound, the capacity of the pen to absorb excess ink flows is greatly increased. The collector may be of a size to facilitate its manufacture from a breakable and relatively inexpensive material with a minimum of breakage and loss in manufacturing and assembling. The collector 30 not only collects excess ink but it serves as the sole anchorage for the nib 31 and feed bar 32, and it provides therewith feed channels of desired capillary form. This arrangement simplifies assembly and maintenance of the feed mechanism. It permits the nib 31 to be assembled without injury or distortion and it tends to keep the nib in properly adjusted condition at all times. By placing the collector 30 around the nib 31, the external shaping of the pen to fit the hand is facilitated. The structure as a whole is quite compact and sturdy and tendency to smear the hand of the user with ink is practically eliminated. Smooth writing performance is assured and leaking or flooding of the pen is eliminated.

Another feature has to do with the minimizing of tendency of the pen to dry out when exposed to the atmosphere. This is accomplished in part by the extensive capillary ink feed spaces 49 and 50 within the collector 30 and in part by the capillary space 55 between the nib 31 and the shell 33. The outermost ink film space 56 keeps air away from the nib slit 45 and prevents the entry of air therethrough to the connected ink flow capillary spaces 49 and 50. The ink film in the space 56 also keeps the nib slit 45 damp at all times for instant writing. Furthermore, the ink-filled space 56 provides an effective ink flow block or

dam at the writing end of the pen and thereby facilitates somewhat the action causing flow of excess ink into the collector cells 36<sup>a</sup> instead of to the writing point. The extensive capillary spaces 49 and 50 also aid somewhat in this action. The tubular nib and feed bar arrangement above described aids in the accomplishment of the foregoing feature by providing extensive, annular or tubular capillary spaces which are kept filled with a thin film of ink and which tend to keep the feed mechanism moist, so to speak, and through which spaces the ink must find its way from a bottom inlet to a top exit.

The smooth writing characteristics of nib 31 are due, in part, to being supported by shell 33 at the writing point thereof. In writing, a slight pressure is exerted on the nib point and both nib sections 46 will flex, thereby pressing the nib sections 46 against the adjacent wall of the shell 33. This insures proper nib section or prong alignment. Also, contact between nib 31 and shell 33 dampens any tendency of the nib sections 46 to vibrate due to rough paper surfaces and other causes, and it insures smoother writing at all times.

Fountain pen structures embodying my invention may take various forms, another of which is illustrated in Figs. 11-14, inclusive. This structure differs from that previously described in the form of the excess ink collector, which does not include cell-forming fins, there being one large collector space instead of a plurality of spaces or cells such as the cells 36<sup>a</sup> of Fig. 3.

Specifically, referring to Figs. 11-14, inclusive, the structure includes a barrel 70 providing an ink reservoir 71 adapted to be filled with ink by filling mechanism such as shown in Fig. 2, and which includes an air breather tube 72. The barrel 70 is provided with a forward reduced extension 73 which supports ink feeding mechanism including ink collector member 74, feed bar 75, nib 76 and outer shell 77. All of these parts of the feed mechanism excepting the collector 74 are similar to the corresponding previously described parts, and they are also mounted similarly in the forward extension 73 of the barrel.

The ink collector 74 is provided with a rear reduced and cylindrical shank portion 78 friction-fitted or press-fitted in the forward barrel extension 73. The forward portion of the collector is of somewhat enlarged diameter providing a shoulder 79 which seats against the forward end of the barrel extension 73, and also providing with the outer shell 77 an ink-collecting space 80 extending entirely around the feed mechanism. The forward end of the collector 74 is provided with an enlarged cylindrical flange 81 which extends into fairly close proximity to the adjacent inner wall surface of the shell 77 providing therebetween a rather fine, annular capillary space 82. The collector 74, like the collector 30, is slitted longitudinally to its central opening 83 providing throughout the length of the same a capillary feed passage 84 which connects with the primary ink feed passage 85 between the forward barrel extension 73 and the collector shank 78, and also connects with the space 85<sup>a</sup> between the collector and feed bar 75 which, in turn, connects with the space 86 between the feed bar and the tubular nib 76. On the upper or diametrically opposite side of the collector, I provide a longitudinally extending slot 87 of rectangular cross section extending throughout the length of the enlarged forward portion of the collector and also through the collector flange 81. This slot, 75



which is wider than the space 80 between the collector and the shell 77 serves as an air breather channel quite similarly to the channel 41 of the first-described form.

5 The structure just described operates quite similarly to the previously described structure except that ink in excess of that required for writing purposes, or ink that may be expelled from the reservoir 71 during periods of nonuse  
10 of the pen, is collected in the space 80 instead of a plurality of separated capillary cells. More particularly, under normal flow and writing conditions, ink from the reservoir 71 flows through the main feed channel 85, secondary feed channel 84  
15 and capillary spaces 85<sup>a</sup> and 86 to the writing end 88 of the nib 76 in the manner hereinabove described. When the ink flow exceeds that required for writing purposes or for any reason exceeds the capacity of the ink feed passages, the  
20 excess ink finds its way into the space 80 from the secondary ink feed passage 84. The collector passage 84 is of less width than the width of the space 80, thereby setting up an edge block condition preventing ink from entering the space 80  
25 except under the conditions above explained and as particularly explained with respect to the feed slot 40 and capillary cells 36<sup>a</sup> of the first described form. The excess ink, in entering the space 80 may under certain conditions, dependent  
30 in part upon the position which the pen assumes when that action takes place, enter the space 80 at the rear thereof and fills such space in forward direction, and in other instances it may enter the space 80 in such a way as to fill the same from  
35 its forward part rearwardly. In either event, the capillary space 82 provided by the forward collector flange 81 and shell wall blocks, in a manner which will be well understood, the flow of ink from the space 80 to the forward end of the  
40 pen; and, also, since the air breather groove 87 is of greater width than the space 80, the edge block tendency afforded between the edges of the slot 87 and the adjacent shell wall surfaces tends to prevent the ink from entering the air breather  
45 channel 87. In this way, the space 80 at all times remains open to atmosphere through the air channel 87 and the forward nib and shell openings 90 and 91, respectively, so that the pen may properly breathe through the channel 87 at all  
50 times for normal filling and emptying of the space 80 and normal feeding of ink from the reservoir 71. This feature is of importance in uniform control of the ink feed since, if the air breather channel 87 should become clogged or  
55 filled with ink and the air flow passages cut off, there would be a tendency for excess ink to be forced to the writing point 88 of the pen where it would drip or leak therefrom. This particular form of structure has an additional advantage of  
60 simplicity and cheapness. It is much easier to manufacture than the multi-cell form and it lends itself to the use of cheaper materials which would not be suitable for multi-cellular structures.

65 While I have illustrated the space 80 as being of substantially uniform width throughout its length, the shell 77 and collector 74 being correspondingly tapered to this end, it is to be understood that, in some instances, the space 80  
70 may gradually increase in width from its rear end toward the outer or writing end portion of the pen. This arrangement would tend to cause excess ink, at all times and under all conditions, to fill the space 80 from its rear end toward its  
75 outer end and to empty such space from its

outer end inwardly toward its rear end. This action would take place for substantially the same reasons as explained in connection with the progressively increasing size of the capillary cells 36<sup>a</sup> of the first form. In fact, the spacing  
5 of the capillary cells 36<sup>a</sup> with respect to the shell 33 of the first form may be varied as above stated to facilitate further the action described in connection with such cells. In employing such  
10 an arrangement in the form of Fig. 11, the flange 81 is, preferably, not reduced, thereby retaining the capillary space 82. Other than above described, the construction and operation of  
15 the form of Fig. 11 is the same as that of Fig. 3.

Both of the pen structures above described  
15 further include a so-called closure cap 95 which is illustrated as applied to the pen of Figs. 1 and 3. This cap 95 is adapted to be retained upon the barrel, at either its forward or rear end, by a slip fit thereby enabling it to be readily applied  
20 and removed by merely exerting endwise pressure thereon.

The cap 95 includes an outer, open-ended cylindrical shell 96 formed of metal or other suitable material, one end of which is closed by a  
25 tubular insert 97 which projects beyond the end of the shell for reception of a collar portion 98 of a clip member 99. The clip is retained in place by a screw member 100, the threaded portion of which engages a threaded opening 101  
30 in the adjacent end of the insert 97. The insert 97 extends approximately half the length of the shell 96 and from it there extends a shell-mounted metallic insert 102. Both of the inserts 97 and 102 are press-fitted or otherwise  
35 frictionally secured within the shell 96, the insert 97 being additionally secured by the clip mounting above described.

The shell insert 102 is provided near its forward open end portion with slits 104 dividing  
40 the insert longitudinally into an annular series of spring fingers 105 that are bowed inwardly (Figs. 8 and 9) to provide yieldable gripping surfaces. The fingers 105 are so positioned that, when the cap is mounted over the writing end  
45 of the pen, they are aligned with the joint between the shell 33 (or shell 77) and the reduced shell extension 34 (or 73), in which joint is mounted a ring 106 (Figs. 2-4) having a pair of spaced, circumferential ribs 107. The spring  
50 fingers 105 of the cap are bowed inwardly to such an extent that when the cap is placed upon the front end of the pen, they engage the ring ribs 107 under sufficient tension to yieldably grip and retain the cap 95 firmly in position  
55 upon the pen. The outer diameter of the main portion of the barrel 20 is substantially equal to the outer diameter of the adjacent open end portion of the cap 95, and the barrel extension 34 is of such reduced diameter that, when the cap 95 is placed in position thereon, its open end abuts against a shoulder 108 formed between the reduced extension 34 and the main barrel 20 with the barrel and cap surfaces disposed in flush relation as indicated at F' in Figs. 65  
1 and 3. With this arrangement, the open end of the cap 95 is sealed against the barrel 20, providing an airtight closure for the writing end portion of the pen. This closure is maintained without threaded portions or the like, and without the engagement of any parts that might tend to injure the feeding mechanism, until the user applies sufficient force to withdraw the cap endwise from the pen barrel. If desired, the insert  
70 97 may be so related to the outer shell 33 as to

further aid the sealing of the writing end portion of the pen, but, preferably, this insert is of such thickness and extends into the cap shell such a distance that, while it lies in close proximity to the outer wall of the shell (33 or 77), it will not contact the same sufficiently to mar the surface thereof. The cap is mounted in the position shown in Figs. 1 and 3, when the pen is not in use and, when it is removed for use of the pen, it may be mounted on the opposite end of the pen barrel in the customary manner. When the cap is in this latter so-called pen-open position, it is retained in place by frictional engagement with the pen barrel and the spring fingers 105 may aid somewhat in this retaining action.

The cap arrangement above described aids in maintaining the ink feed mechanism in desired moist and ready-writing condition during periods of non-use of the pen. It also facilitates the shaping of the pen from the standpoint of appearance as well as the standpoint of balance and shape best suited to the hand of the user.

I believe that the operation and advantages of my invention will be well appreciated from the foregoing description, and it is to be understood that, while I have shown and described two forms of my invention, other details and arrangements of parts may be resorted to without departing from the spirit and scope of my invention as defined by the claims that follow. I claim:

1. In a fountain pen, a barrel having an ink reservoir therein, and means for controlling the flow of ink from said reservoir including a hollow member having one end mounted in said barrel in communication with said reservoir and its other end projecting therefrom, a nib carried by said other end of said member and having a writing point adapted to engage a surface to be written upon, means providing an ink passage in said member leading from said reservoir to said writing point, means associated with said member and connected to said passage for receiving and storing ink therefrom when the amount of ink flowing through said passage is in excess of that required for existent writing purposes, said means being so located that said passage is between it and said reservoir with said passage constituting the sole ink connection between said reservoir and said storage means, and a shell member detachably secured to said barrel and enclosing substantially all of the foregoing feed mechanism parts except said writing point, said shell member having an opening for admitting air to said reservoir under the control of said ink storage means whereby the storage of ink in said storage means is adapted to cut off flow of air to said reservoir and, in turn, the flow of ink from said reservoir.

2. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding and controlling the flow of ink from said reservoir comprising a hollow member mounted in said barrel in communication with said reservoir, a nib carried by said member and having a writing point adapted to engage the surface to be written or marked upon, means providing an ink passage in said member through which ink from said reservoir flows to said writing point, means for controlling the flow of ink through said passage including a plurality of capillary cells in said member each connected to said passage for receiving ink therefrom when the

amount of ink flowing therein is in excess of that required for writing purposes, and a shell member carried by said barrel and shaped externally to be grasped by the user and shaped internally to enclose in spaced relation the foregoing parts of the feed mechanism except said writing point which is exposed for writing contact with a surface, said shell having an opening through which air is admitted to said reservoir under the control of said cells.

3. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding and controlling the flow of ink from said reservoir comprising a hollow member mounted in said barrel in communication with said reservoir, a nib carried by said member and having a writing point adapted to engage the surface to be written or marked upon, means providing an ink passage in said member through which ink from said reservoir flows to said writing point, means for controlling the flow of ink through said passage including a plurality of capillary cells each connected to said passage for receiving ink therefrom when the amount of ink flowing therein is in excess of that required for writing purposes, said feeding means constituting a self-contained unit, and an independently detachable shell member carried by said barrel and enclosing all of the foregoing parts of the feed mechanism except said writing point which is exposed for writing contact.

4. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding and controlling the flow of ink from said reservoir comprising a hollow member mounted in said barrel in communication with said reservoir, a nib carried by said member and having a writing point adapted to engage the surface to be written or marked upon, means providing an ink passage in said member through which ink from said reservoir flows to said writing point, means for controlling the flow of ink through said passage including a plurality of capillary cells each connected to said passage for receiving ink therefrom when the amount of ink flowing therein is in excess of that required for writing purposes, means providing an air breather channel in said hollow member apart from said ink passage and common to all said capillary cells, and a shell member carried by said barrel and enclosing all of the foregoing parts of the feed mechanism except said writing point, said shell having an opening through which said writing point extends and through which said breather channel is connected to atmosphere at one end.

5. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding and controlling the flow of ink from said reservoir comprising a hollow member mounted in said barrel in communication with said reservoir, a nib carried by said member and having a writing point adapted to engage the surface to be written or marked upon, means providing an ink passage in said member through which ink from said reservoir flows to said writing point, means providing a plurality of capillary cells within said member each of which is connected to said passage for receiving ink flowing therethrough in excess of that required for writing purposes, means providing an air breather channel within said member common to all said capillary cells, and a shell member carried by said barrel and detachable independently of and without disturbing said ink feeding and controlling means, said shell enclosing all of the foregoing parts

of the feed mechanism except said writing point, said shell member having an opening through which said writing point extends for contact with a surface and through which one end of said breather channel is connected to atmosphere.

6. In a fountain pen, a barrel having an ink reservoir therein, and ink feed and control mechanism comprising a hollow member having one end mounted in said barrel in communication with said reservoir, a nib having a writing point and carried by said member, means providing an ink channel in said member and through which ink from said reservoir flows to said writing point, and means for controlling flow of ink through said channel including a plurality of circular, spaced fins extending circumferentially and entirely around said member exteriorly and providing a plurality of capillary cells, said channel and said cells being so constructed and arranged that each of said cells is connected individually to said channel, ink is received in said channel only when the flow of ink tends to exceed the normal capacity of said channel as determined by the amount of ink required for writing purposes, and the ink received in said cells fills the latter from said channel toward a point diametrically opposite the same, and a shell member enclosing said hollow member and nib except the writing point of the latter.

7. In a fountain pen, a barrel having an ink reservoir therein, and ink feed and control mechanism comprising a hollow member having one end mounted in said barrel in communication with said reservoir, a nib having a writing point and mounted within said member, means providing an ink channel in said member and through which ink from said reservoir flows to said writing point, and means for controlling flow of ink through said channel including a plurality of circular, spaced fins extending circumferentially and entirely around said member exteriorly of said nib and providing a plurality of capillary cells, said channel and said cells being so constructed and arranged that each of said cells is connected individually to said channel, and ink is received in said cells only when the amount of ink flowing through said channel is in excess of that required for writing purposes, and means providing an air breather channel in said member exteriorly of said nib at a point circumferentially removed from said ink channel, said breather channel being connected to each of said cells and having one end thereof connected to the atmosphere.

8. In a fountain pen, a barrel having an ink reservoir therein, and ink feed and control mechanism comprising a hollow member having one end mounted in said barrel in communication with said reservoir, a nib having a writing point and mounted within said member, means providing an ink channel in said member and through which ink from said reservoir flows to said writing point, and means for controlling flow of ink through said channel including a plurality of circular, spaced fins extending circumferentially and entirely around said member exteriorly and providing a plurality of capillary cells, said channel and said cells being so constructed and arranged that each of said cells is connected individually to said channel, and ink is received in said cells only when the amount of ink flowing through said channel is in excess of that required for writing purposes, and means

providing an air breather channel in said member extending transversely of said cells in direct communication with each of the latter and connected at one end to the atmosphere, said feed channel being located in the under side of said member and said breather channel being located in the diametrically opposed top side of said member, whereby ink entering said cells from said feed channel moves upwardly under the influence of capillary attraction expelling air upwardly from said cells into said breather channel.

9. In a fountain pen, a barrel having an ink reservoir therein, and ink feed and control mechanism comprising a hollow member having one end mounted in said barrel in communication with said reservoir, a nib having a writing point and mounted within said member, means providing an ink channel in said member and through which ink from said reservoir flows to said writing point, and means for controlling flow of ink through said channel including a plurality of circular, spaced fins extending circumferentially and entirely around said member exteriorly and providing a plurality of capillary cells, said channel and said cells being so constructed and arranged that each of said cells is connected individually to said channel, ink is received in said channel only when the flow of ink tends to exceed the normal capacity of said channel as determined by the amount of ink required for writing purposes, and the ink received in said cells fills the latter from said channel toward a point diametrically opposite the same, and a cylindrical shell member carried by said barrel and enclosing said hollow member and said nib except for the writing point thereof, said shell having its inner wall spaced from the peripheries of said fins and having an opening through which said writing point projects for contact with a surface.

10. In a fountain pen, a barrel having an ink reservoir therein, and ink feed mechanism carried by said barrel which comprises a feed unit including a member mounted in said barrel and forming with the latter a primary ink passage in communication with said reservoir, a feed bar mounted in and extending forwardly of said member, a nib having a shank portion mounted in said member and surrounding said feed bar and having a writing end portion with a writing tip mounted over the forwardly extending portion of said feed bar, said member, feed bar and nib being constructed and arranged to provide a continuous secondary feed passage of capillary form extending from said reservoir and primary ink passages to the writing end portion of said nib, and a shell member carried by said barrel and enclosing substantially all of said feed unit, said shell having an opening through which said writing tip projects to engage a surface.

11. In a fountain pen, a barrel having an ink reservoir therein, and ink feed mechanism carried by said barrel comprising a feed unit including a member having an axial opening there-through and mounted in said barrel and forming with the latter a primary ink passage in communication with said reservoir, a tubular nib mounted in the forward part of said member opening and having a writing end portion extending forwardly from said member, a feed bar mounted in said tubular nib with one end thereof mounted in said member opening rearwardly of said nib, the parts of said feed unit being constructed and arranged to provide an ink feed passage of capillary form extending from said

primary ink passage to the nib writing end portion, and a shell member carried by said barrel and extending over and concealing said feed unit member with only a part of said nib writing end portion left exposed for writing contact with a surface.

12. In a fountain pen, a barrel having an ink reservoir therein, and ink feed mechanism carried by said barrel comprising a feed unit including a member having an axial opening therethrough and having a shank part adapted to be mounted in said barrel and shaped to form therewith a primary ink feed passage, said member also being longitudinally slitted through its wall providing a secondary ink passage connecting said primary passage with said member opening, a tubular nib mounted in said member opening and having a writing end portion projecting forwardly therefrom, a feed bar mounted within said nib and extending rearwardly therebeyond into said member opening for support thereof, said feed bar forming with said member a feed passage communicating with said secondary passage and forming with said nib another feed passage in communication with said first feed passage, and a shell member carried by said barrel and enclosing all said feed unit except the outer end of said nib writing end portion.

13. In a fountain pen, a barrel having an ink reservoir therein, and ink feed mechanism carried by said barrel comprising a feed unit including a member having an axial opening therethrough and having a shank part adapted to be mounted in said barrel and shaped to form therewith a primary ink feed passage, said member also being longitudinally slitted through its wall providing a secondary ink passage connecting said primary passage with said member opening, a tubular nib mounted in said member opening and having a writing end portion projecting forwardly therefrom, a feed bar having a part of circular cross section mounted within said nib and extending rearwardly therebeyond into a rear part of said member opening for support thereof, said feed bar forming with said member and rearwardly of said nib, an annular capillary feed passage communicating with said secondary passage and forming with said nib another annular feed passage in communication with said first annular feed passage, all said feed passages progressively diminishing in size from said primary feed passage to and including said second annular passage, and a shell member carried by said barrel and enclosing all said feed unit except the outer end of said nib writing end portion.

14. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding ink from said reservoir for writing purposes comprising a feed unit including a tubular member having one end mounted in said barrel in communication with said reservoir and forming with said barrel a primary ink feed passage, said tubular member being slitted lengthwise providing a secondary ink feed passage communicating with said primary passage, a tubular nib mounted within said tubular member and having a writing end portion with a writing point projecting forwardly therefrom, a feed bar mounted within said nib and extending rearwardly therefrom for support engagement with said tubular member, said feed bar forming with said tubular member an annular ink passage communicating with said secondary passage and forming with said nib another annular ink passage communi-

cating with said first annular passage, said tubular member having a substantial part thereof projecting forwardly from said barrel and in which is provided a longitudinal air breather channel opposite said secondary passage with which it communicates, and a shell member detachably carried by said barrel and covering all said feed unit except for the writing point of said nib.

15. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding ink from said reservoir for writing purposes comprising a feed unit including an elongated cylindrical member having its one or inner end mounted in said barrel in communication with said reservoir and having a concentric axial bore extending therethrough, said bore having variable diameter portions with the outer thereof of greatest diameter and the inner thereof of least diameter, a tubular nib snugly fitted in the outer diameter portion of said bore and having a writing end portion with a writing point extending beyond said member, a feed bar having a cylindrical part extending freely through said nib and providing therewith an annular ink space of capillary form, the rear end of said feed bar fitting snugly in one of said diameter portions rearwardly removed from said nib and forming with an intermediate of said diameter portions an annular ink space of capillary form connecting with said first-named ink space, means providing for the feed of ink from said reservoir to said second-named ink space, and a shell member carried by said barrel and covering all said feed unit except said writing point.

16. In a fountain pen, a barrel having an ink reservoir therein, and means for feeding ink from said reservoir which comprises a feed unit including a cylindrical member having an axial bore and having one end mounted in said barrel in communication with said reservoir with a substantial part projecting from said barrel, a tubular nib mounted in the outer end of the bore of said member and having a writing end portion projecting forwardly therefrom, a feed bar mounted in the rear end of the bore of said member and extending forwardly within said nib, said feed bar being spaced from said nib and the wall of said bore to form connected ink passages of capillary form, means on one side of said member forming an ink channel for feeding ink from said reservoir to said passages, means diametrically opposed to said ink channel forming an air breather channel extending longitudinally throughout the projecting portion of said member, and a shell member surrounding said cylindrical member in spaced relation thereto providing a space in communication with both said air and ink channels.

17. In a fountain pen, a barrel having an ink reservoir therein, an ink feed mechanism carried by said barrel which comprises a feed unit including a tubular member having one end thereof mounted in said barrel in communication with said reservoir with its other end projecting forwardly from said barrel and having an axial bore therein, a tubular nib having a cylindrical shank portion snugly fitted within the outer end of the bore of said member and having a writing end portion projecting therefrom and slit longitudinally from its writing point and otherwise shaped to provide V-shaped writing nib sections, a feed bar mounted in said nib with its rear end projecting therethrough into supporting engagement with the bore of said member, said feed

bar being of such size that it provides with said nib a fine annular capillary ink space and it provides with the wall of the bore of said member rearwardly of said nib a slightly wider annular ink space of capillary form, channel means between said last-mentioned ink space and said reservoir for feeding ink to such ink space, and a shell member carried by said barrel and surrounding said first-mentioned member and the writing end portion of said nib except its writing point, said shell having a surface shaped substantially complementally to and slightly spaced above the writing nib section surfaces and providing therebetween a fine capillary ink space overlying the slit in the writing end portion of said nib.

18. In a fountain pen, a barrel having an ink reservoir therein, an ink feed mechanism carried by said barrel which comprises a feed unit adapted to be slip-fitted in the forward end of said barrel and to be applied and removed from the barrel merely by applying endwise pressure to said unit, said unit including an elongated tubular member having a reduced end portion adapted to be slip-fitted in the end of said barrel in communication with said reservoir, said reduced end portion being shaped at one side thereof to provide a primary ink feed channel and being slitted longitudinally throughout its length and entirely through its wall at one side in communication with said primary feed channel to provide a secondary ink feed channel, a tubular nib slip-fitted in the outer end portion of said member and having a writing end portion with a writing tip extending therebeyond, a feed bar extending through and beyond said nib into friction-fit engagement with said member and forming with the latter and said member connected annular ink spaces of capillary form communicating with said secondary feed channel, a cylindrical shell detachably secured at one end to said barrel and extending forwardly therefrom substantially the length of said feed unit and having an opening in its forward end, said shell being of sufficient length to substantially completely enclose said feed unit except for the writing tip of the writing end portion of said nib which projects through said shell opening.

19. In a fountain pen, a barrel having an ink reservoir therein, an ink feed mechanism carried by said barrel which comprises a feed unit adapted to be slip-fitted in the forward end of said barrel and to be applied and removed from the barrel by applying endwise pressure to said unit, said unit including an elongated tubular member having a reduced end portion adapted to be slip-fitted in the end of said barrel in communication with said reservoir, said reduced end portion being shaped at one side thereof to provide a primary ink feed channel and being slitted longitudinally throughout its length and entirely through its wall at one side in communication with said primary feed channel to provide a secondary ink feed channel, a tubular nib slip-fitted in the outer end portion of said member and having a writing end portion with a writing tip extending therebeyond, a feed bar extending through and beyond said nib into friction-fit engagement with said member and forming with the latter and said member connected annular ink spaces of capillary form communicating with said secondary feed channel, a cylindrical shell detachably secured at one end to said barrel and extending forwardly therefrom substantially the length of said feed unit and having an opening

in its forward end, said shell being of sufficient length to substantially completely enclose said feed unit except for the writing tip of the writing end portion of said nib, said shell having an inner wall portion disposed in closely spaced relation to the writing end portion of said nib providing at that point a narrow ink-receiving space of capillary form for maintaining an ink-moist condition at that portion of the nib, said nib having an opening communicating the capillary ink space between it and said feed bar with said space between it and said shell, and also having a slit extending from said opening to its writing tip dividing the writing end portion into writing nib sections.

20. In a fountain pen, a barrel having an ink reservoir therein and ink feed mechanism which comprises a feed unit including a tubular member having a barrel-engaging portion at one end, a tubular nib mounted in the other end of said member and having a writing end portion projecting therefrom, and a feed bar passing through and rearwardly beyond said nib into supporting engagement with said member, said member, nib and feed bar constituting a self-contained unit adapted to be engaged with said barrel by mounting the reduced shank portion of said member in said barrel in communication with said reservoir, and a shell member detachably secured to said barrel and enclosing said feed unit in spaced relation thereto, the writing end portion of said nib having a writing tip and the adjacent end of said shell having an opening through which said tip projects, the arrangement being such that said feed unit is substantially enclosed and concealed by said shell except for said projecting writing tip, and ink feed channel means within said tubular member connecting said reservoir with said writing tip.

21. In a fountain pen, a barrel having an ink reservoir therein and ink feed mechanism comprising a feed unit including a tubular support member having a reduced shank portion adapted to be mounted in said barrel in communication with said reservoir, said member having a part of its wall shaped to provide with said barrel a primary ink feed channel and also having its wall portion adjacent said primary ink feed channel slitted longitudinally throughout its length providing a secondary feed channel communicating with said primary channel, a tubular nib mounted in said member and having a writing end portion projecting therefrom, a feed bar having a cylindrical portion passing through said nib and therebeyond into support engagement with said member, said bar being of such size that there is provided between it and said member a capillary ink passage communicating with said secondary ink channel and there is also provided a capillary ink passage between it and said nib communicating with the first-mentioned ink passage, and a plurality of longitudinally spaced circular fins formed around the exterior of said member outwardly beyond said barrel and providing a plurality of separated capillary cells each of which communicates with said secondary ink channel, means providing an air breather channel extending longitudinally of said member and through said fins at a point removed circumferentially from said secondary feed channel, and a shell carried by said barrel and enclosing said feed unit except the outer end part of said nib writing end portion.

22. In a fountain pen, a barrel having an ink reservoir therein and ink feeding mechanism

which comprises a feed unit including an excess ink collector member having a reduced shank portion adapted to be mounted in said barrel in communication with said ink reservoir, said ink collector member having means providing an ink feed channel and exterior, annular excess ink collecting cells in communication with said channel, said ink collector having a concentric axial bore extending throughout its length, a nib supported in said bore, a feed bar supported in said bore and forming therewith and with said nib capillary ink feed passages, said nib and feed bar being surrounded by said capillary cells with said collector serving as the sole support therefor whereby said collector, nib and feed bar may be applied to and removed from said barrel as a self-contained unit, and a shell carried by said barrel and so constructed and arranged that it encloses in spaced relation said feed unit except for the writing end of said nib.

23. In a fountain pen, a barrel having an ink reservoir therein, feed mechanism comprising a feed unit including an elongated, cylindrical ink collector member having a reduced shank portion adapted to be mounted in said barrel in communication with said reservoir and having a concentric axial bore extending therethrough, said collector member being slitted longitudinally from end to end providing a feed channel communicating with said bore, a plurality of longitudinally spaced circular fins extending exteriorly around said collector member and providing separated capillary cells each communicating with said feed channel, said collector member also having a longitudinal air breather channel formed through said fins and common to all said cells at a position diametrically opposite said feed channel, a tubular nib mounted in the forward part of the bore of said member and having a writing end portion projecting forwardly therefrom, a feed bar having a circular portion extending through said feed bar and therebeyond into supporting engagement with said member, said feed bar being of such size that it forms with said member an annular ink passage of capillary form connecting with said feed channel and it forms with said nib another annular ink passage connecting with said first ink passage, and a cylindrical open-ended shell secured at one end to said barrel and encompassing said collector member and the writing end portion of said nib, the writing end portion of said nib projecting through the adjacent open end of said shell with substantially only its writing point exposed.

24. In a fountain pen, a barrel having an ink reservoir therein, feed mechanism comprising a feed unit including an elongated, cylindrical ink collector member having a reduced shank portion adapted to be mounted in said barrel in communication with said reservoir and having a concentric axial bore extending therethrough, said collector member being slitted longitudinally from end to end providing a feed channel communicating with said bore, a plurality of longitudinally spaced circular fins extending exteriorly around said collector member and providing separated capillary cells communicating with said feed channel, said collector member also having a longitudinal air breather channel formed through said fins and common to all said cells at a position diametrically opposite said feed channel, a tubular nib mounted in the forward part of the bore of said member and having a writing end portion projecting forwardly therefrom, a feed bar having a circular portion extending

through said feed bar and therealong into supporting engagement with said member, said feed bar being of such size that it forms with said member an annular ink passage of capillary form connecting with said feed channel and it forms with said nib another annular ink passage connecting with said first ink passage, and a cylindrical open-ended shell secured at one end to said barrel and encompassing said collector member with the writing end portion of said nib projecting through the adjacent open end of said shell with substantially only its writing point exposed, the writing end portion of said nib being slitted providing writing nib sections and said shell having a substantially complementally shaped surface overlying said nib sections in slightly spaced relation and providing a capillary ink space along the slitted nib portion.

25. In a fountain pen, a barrel having a reservoir therein, and feed mechanism mounted in said barrel in communication with said reservoir, said mechanism comprising a unitary structure including a nib with a writing end portion slitted longitudinally and terminating in a writing point, means providing passages of capillary form for feeding ink from said reservoir to said writing end portion, means connected with said passages and through which the air admitted to said reservoir must pass and adapted to collect therein ink flowing through said passages in excess of that required for writing purposes, and means detachable independently of said feed mechanism and adapted to be grasped by the user and enclosing substantially all of said mechanism except the writing end of said writing point and providing with the enclosed upper part of said writing end portion a fine capillary ink space adapted to receive a film of ink which aids in sealing said writing end portion and said ink feeds passages from the atmosphere.

26. In a fountain pen, a barrel having a reservoir therein, and feed mechanism mounted in said barrel in communication with said reservoir, said mechanism including a nib with a writing end portion slitted longitudinally and terminating in a writing point, means providing passages of capillary form for feeding ink from said reservoir to said writing end portion, means forming a plurality of separated annular cells of capillary form around the outer part of said feed mechanism with each said cell connecting separately with said one passage and adapted to receive from said one passage ink flowing therethrough in excess of that required for writing purposes, means providing a breather channel connected with each of said cells at a point diametrically opposed to said one passage for connecting all said cells to atmosphere, the arrangement being such that excess ink fills said cells from said one ink passage toward said breather channel, and means adapted to be grasped by the user and enclosing all of said mechanism except said writing point and providing with the enclosed upper part of said writing end portion a fine capillary ink space adapted to receive a film of ink which aids in sealing said writing end portion and said ink feed passages from the atmosphere.

27. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding mechanism comprising a hollow member having an end part adapted to be mounted in said barrel in communication with said reservoir, a nib mounted within said member and having a writing portion projecting therefrom, means including an ink passage in said member and through which ink

flows from said reservoir to said writing end portion, a shell member detachably carried by said barrel independently of the ink feeding mechanism and extending over and enclosing said hollow member in spaced relation thereto, said shell member also enclosing said nib except the writing point of its writing end portion, and said passage being connected to and substantially throughout the length of the space between said members whereby ink flowing through said passage in excess of that required for writing purposes is collected in said space, and means providing an air breather channel in said hollow member separate from said ink passage which channel is connected with said space throughout its length.

28. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding mechanism comprising a hollow cylindrical member having one end mounted in said barrel with the remainder thereof projecting from said barrel, a nib mounted in said member and having a writing end portion with a writing point, means providing an ink channel in said member and through which ink from said reservoir flows to said writing end portion, a cylindrical shell carried by said barrel and enclosing said member in spaced relation thereto, said member having an enlarged cylindrical flange at its forward end providing an ink collecting space between said shell and member, said channel connecting with said space so that ink flowing through said channel in excess of that required for writing purposes is deposited in said space, and means providing an air breather channel in said member which is connected throughout with said space and at one end to the atmosphere through said flange.

29. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding mechanism comprising a cylindrical hollow member having one end mounted in said barrel with the remainder thereof projecting therefrom, a nib mounted in said member and having a writing end portion projecting forwardly therefrom, means providing an ink channel in said member through which ink flows from said reservoir to said writing point, a cylindrical enlarged flange at the outer end of said member, a cylindrical shell surrounding said member, flange and nib in spaced relation and providing between said flange and barrel an ink collecting space connected to said ink channel and providing an annular capillary space between said flange and shell, and means providing an air breather channel extending longitudinally in an exterior wall of said member and through said flange at a point removed circumferentially from said ink channel.

30. In a fountain pen, a barrel having an ink reservoir therein, and ink feeding mechanism comprising a cylindrical hollow member having one end mounted in said barrel with the remainder thereof projecting therefrom, said member being slotted longitudinally from end to end entirely through its wall into its hollow portion and providing an ink feed channel connected to said reservoir, a tubular nib mounted in said member and having a writing end portion projecting therefrom, a feed bar extending through and beyond said nib and supported by said member and forming with the latter and said nib capillary ink passages of capillary form, a cylindrical flange at the outer end of said member, a shell covering the projecting portions of said member and nib and forming with said member an annular ink receiving space around said mem-

ber communicating throughout its length with said feed channel, and means providing a longitudinally extending air breather channel in said member connected throughout to said ink collecting space and extending at one end through said flange where it is connected with the atmosphere.

31. In a fountain pen having ink feed mechanism having a pen nib with a writing point, a barrel having a cylindrical outer wall with a reduced forward end portion forming with the adjoining main barrel wall an annular shoulder, a shell-like extension projecting from said reduced forward end portion of said barrel and adapted for enclosing the ink feed mechanism except the writing point thereof, and an elongated cylindrical closure cap open at one end and closed at its other end, the open end of said cap having the same outside diameter as the main barrel wall and adapted to fit upon said reduced barrel end portion with its end edge uniformly abutting said shoulder, the arrangement being such that said cap may be mounted on the front end of the barrel with its outer surface disposed flush with the outer exposed barrel wall, and yieldable means between said cap and forward barrel end portion for releasably and yieldably retaining said cap on the barrel sealed against said shoulder.

32. In a fountain pen having ink feed mechanism having a pen nib with a writing point, a barrel having a cylindrical outer wall with a reduced forward end portion forming with the adjoining main barrel wall an annular shoulder, a shell-like extension projecting from said reduced forward end portion of said barrel and adapted for enclosing the ink feed mechanism except the writing point thereof, a ring member confined between said shell and said reduced forward end of said barrel and having at least one exposed annular rib projection beyond the adjacent surfaces of said shell and said forward end portion, and an elongated cylindrical closure cap open at one end and closed at its other end, the open end of said cap having the same outside diameter as the main barrel wall and adapted to fit upon said reduced barrel end portion with its end edge uniformly abutting said shoulder, the arrangement being such that said cap may be mounted on the front end of the barrel with its outer surface disposed flush with the outer exposed barrel wall, and means mounted in said barrel cooperating with said rib to yieldably retain said cap upon said barrel in engagement with said shoulder, said means including a member mounted in the forward part of said cap and having an annular series of spaced longitudinally extending spring sections bowed toward the axis of said cap sufficiently for the same to be depressed and placed under tension by said rib as said cap is mounted on the forward end of said barrel.

33. In a fountain pen having ink feed mechanism, a barrel having a cylindrical outer wall with a reduced forward end portion forming with the adjoining main barrel wall an annular shoulder, a shell-like extension projecting from said reduced forward end portion of said barrel adapted for enclosing a substantial part of the ink feed mechanism, and an elongated cylindrical closure cap open at one end and closed at its other end, the open end of said cap having the same outside diameter as the main barrel wall and being adapted to fit upon said reduced end portion with its end edge uniformly abutting said

shoulder, the arrangement being such that said cap may be mounted on the front end of the barrel with its outer surface disposed flush with the outer exposed barrel wall, and means between said cap and forward barrel end portion for releasably retaining said cap on the barrel sealed against said shoulder.

34. In a fountain pen, a barrel having an ink reservoir, and ink feed and control mechanism comprising a hollow member adapted to be detachably fitted in one end of the barrel in communication with said reservoir, a nib adapted to be detachably fitted in the outer end of said hollow member, a feed control element detachably fitted within said nib and hollow member and forming with said nib and hollow member connected capillary ink passages, said hollow member, nib and control element constituting a self-contained unit that may be detached from the barrel as a unit without disturbing their assembly relationship, and a shell member detachably carried by said barrel and enclosing said unit except the writing tip end of the nib thereby preventing displacement of said unit except upon detachment of said shell member.

35. In a fountain pen, a barrel having an ink reservoir, and ink feed and control mechanism comprising a hollow member adapted to be detachably fitted in one end of the barrel in communication with said reservoir, a nib adapted to be detachably fitted in the outer end of said hollow member, a feed control element detachably fitted within said nib and hollow member and forming with said nib and hollow member connected capillary ink passages, means associated with said hollow member and connected with at least one of said capillary passages for collecting and storing ink flowing through said passages in excess of that required for writing purposes, said hollow member, nib, control element and storage means constituting a self-contained unit that may be detached from the barrel as a unit without disturbing their assembly relationship, and a shell member detachably carried by said barrel and enclosing said unit except the writing tip end of the nib thereby preventing displacement of said unit except upon detachment of said shell member.

36. In a fountain pen, a barrel having an ink reservoir; a self-contained ink feeding unit which comprises a member connected to said barrel by a slip-fit connection and having formed therein an ink passage communicating with the ink in said reservoir, a nib supported by said member and having a slip-fit connection therewith with its writing end portion connected to said ink passage, means formed within said barrel-carried member and communicating with said ink passage for receiving and storing ink in excess of that required for existent writing needs, air connection means formed within said barrel-carried member by which said ink storage means is connected throughout to the atmosphere, said air connection means being connected to said reservoir through said storage means only; and means for enclosing and substantially concealing said unit which comprises a finger-grip shell adapted to be detachably secured to the forward end of said barrel and surrounding said unit in spaced relation except for the writing end tip portion of said nib, the forward end of said shell being tapered toward a smaller diameter than the pen barrel and having an opening through which the tip end of said nib projects and through which air is admitted to said air connection means.

37. In a fountain pen, a barrel terminating at its forward end in a shell-like extension, ink feed mechanism including a pen nib mounted within said extension with the writing tip of said nib projecting therefrom, an elongated cylindrical cap open at one end and closed at its other end, the open end of said cap being adapted to fit freely over the barrel wall with the closed end of said cap enclosing said extension and exposed nib point, means between said cap and the part of the barrel adapted to be closed by the cap for yieldably and releasably retaining the cap on the barrel in condition to be removed merely by applying pressure outwardly thereto, and means between the cap and the barrel for limiting the extent to which said cap may be moved longitudinally upon the barrel.

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