

(No Model.)

2 Sheets—Sheet 1.

L. B. WOOLFOLK.
FOUNTAIN PEN.

No. 480,800.

Patented Aug. 16, 1892.

Fig.1,

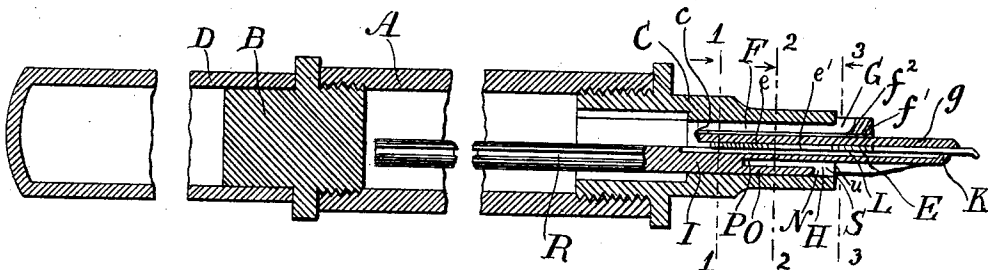


Fig.2

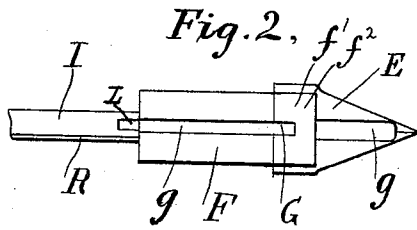


Fig. 6.

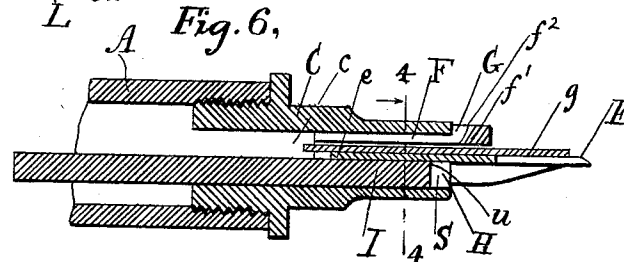


Fig. 8.

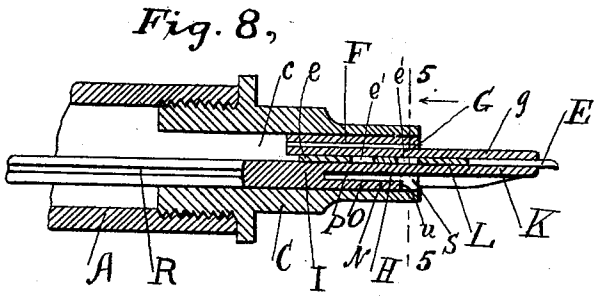


Fig. 9.

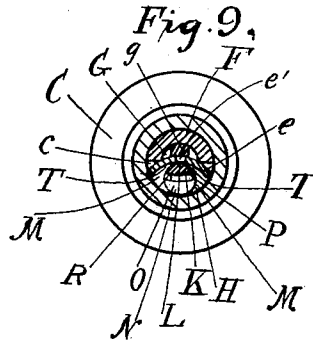


Fig. 5.

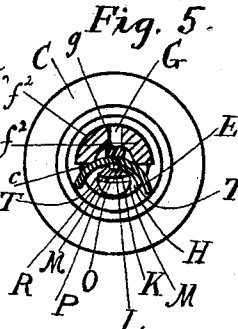


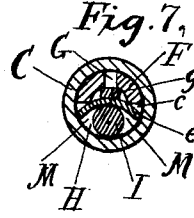
Fig. 4.



Fig. 3.



Fig. 7.



WITNESSES:

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L. B. WOOLFOLK.
FOUNTAIN PEN.

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Fig. 10.

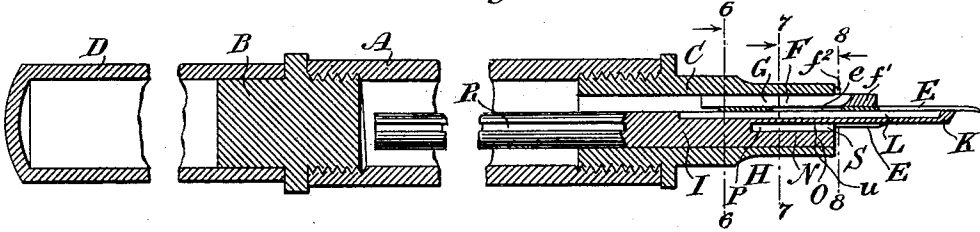


Fig. 12.

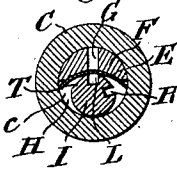


Fig. 13.



Fig. 14.

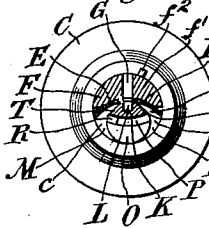


Fig. 11.

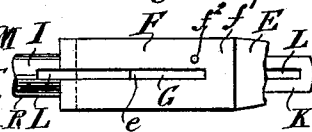


Fig. 16.

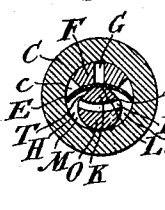


Fig. 17.

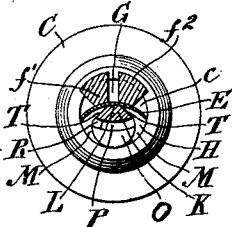


Fig. 15.

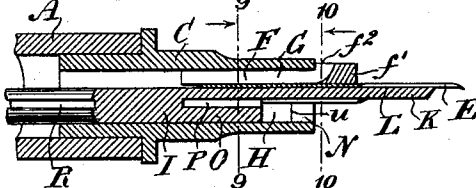


Fig. 19.

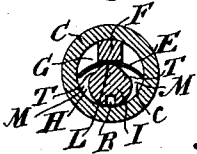


Fig. 20.

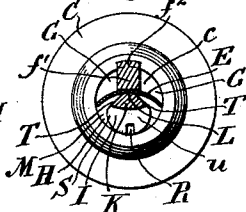
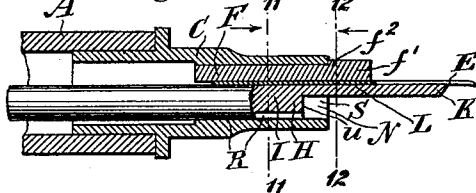


Fig. 18.



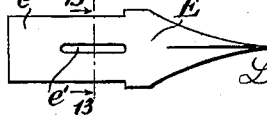
Witnesses:

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Fig. 22.



Fig. 21.



Inventor.

Lucius B. Woolfolk

UNITED STATES PATENT OFFICE.

LUCIEN B. WOOLFOLK, OF CINCINNATI, OHIO.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 480,800, dated August 16, 1892.

Application filed May 21, 1892. Serial No. 433,898. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN B. WOOLFOLK, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

This invention relates especially to fountain-pens in which the ink-holder consists of a barrel closed at the upper end and a point-section joined to the lower end thereof in any suitable manner, said point-section being traversed by a hole in which the pen is held firmly by the pressure of a back-stay upon the back thereof, and below the pen in said hole is a sub-chamber in which a feed-rod integral with a feed-tongue is held, and ducts and channels are provided for the flow of ink from the ink-holder to the point of the pen and the inflow of air into the ink-holder.

It is the aim of my invention to simplify fountain-pens as far as practicable, and at the same time to provide a fountain-pen that will work efficiently, flowing readily and freely without skipping and without leaking while in use and in which the entrance of air into the ink-holder and the flow of ink to the pen may be regulated.

To this end in the form of this invention the ink-holder consists of a barrel closed at the upper end, together with a point-section joined to the lower end of the barrel by a screw or by a smooth flange inserted into the barrel, as into a socket, or in any other suitable manner. Through the point-section extends a traversing-hole, which is of smaller diameter than the interior of the barrel in order to prevent "leakage." The pen is placed in this traversing hole in such a manner as to have above it sufficient space for the entrance of air into the ink-holder, and in the space back of the pen a back-stay is provided which by pressure upon the back of the pen holds it firmly against the inner wall of the traversing-hole. This back-stay extends, preferably, a little farther into the point-section than the heel of the pen, though it may stop short of the heel end of the pen, and it has upon its lower end an extension or lip, which extends below the lower end of the point-section along the back of the pen. In the preferred form of my invention this back-stay

has in it a groove traversing its under side next the pen, which constitutes the lower part of the air-inlet for the admission of air into the ink-holder, and a slot is cut in the back-stay extending down below the lower end of the point-section into the lip constituting the upper part of the air-inlet, and in the lower part of the air-inlet a small back-strip is provided, preferably fitted in a movable manner, and extends along the back of the pen, partly closing up the lower part of the air-inlet and conducting ink to the point of the pen, and an ink-aperture in the heel of the pen allows the ink in the air-inlet to pass to the point of the pen. When the pen is held in position by the back-stay, there is a sub-chamber below the pen in the traversing-hole of the point-section. A feed-rod is held in this sub-chamber, having its upper end extending above the upper end of the point-section into the barrel and having a feed-tongue integral with its lower end extending in proximity with the pen down to near the pen point or nib. In the feed-tongue and feed-rod is an ink-conduit to conduct ink to the point of the pen. Beneath the feed-tongue in the sub-chamber in the point-section is a vacant space, which is herein designated as the "vacancy." A finger is provided upon the lower side of the feed-rod and integral therewith, extending down into said vacancy, leaving between the finger and the feed-tongue a narrow cleft or slot. On either side of the feed-rod are vacant spaces between the feed-rod and the sides of the sub-chamber below the pen, designated as "ink-ways," and in the feed-rod is cut an ink-passage communicating between the ink-holder and the narrow cleft or slot below the pen, and ink-spaces are cut away on either side of the feed-tongue.

In the accompanying drawings the figures are all on an enlarged scale, the better to represent the various parts of the invention. The cross-section lines have arrows attached to them pointing in the direction of the views.

Figures 1, 2, 3, 4, and 5 represent the preferred form of my invention. Fig. 1 is a longitudinal section of a fountain-pen representing my invention, the upper end of the feed-rod being shown in side elevation. Fig. 2 is a fragmentary plan of the pen and feed appa-

ratus detached. Fig. 3 is a cross-section of same on line 1 1 of Fig. 1. Fig. 4 is a cross-section of same on line 2 2 of Fig. 1. Fig. 5 is a cross-section of same on line 3 3 of Fig. 1.

5 Figs. 6 and 7 represent a modification of my invention. Fig. 6 is a longitudinal section of the lower part of a fountain-pen. Fig. 7 is a cross-section of same on line 4 4 of Fig. 6.

10 Figs. 8 and 9 represent another modification of my invention. Fig. 8 is a longitudinal section of the lower part of a fountain-pen having the feed-rod partly in side elevation. Fig. 9 is a cross-section of same on line 5 5 of Fig. 8.

15 Figs. 10, 11, 12, 13, and 14 represent another modification of my invention. Fig. 10 is a longitudinal section of a fountain-pen, the upper end of the feed-rod being shown in side elevation. Fig. 11 is a fragmentary plan of the pen and feed apparatus detached. Fig. 12 is a cross-section of same on line 6 6 of Fig. 10. Fig. 13 is a cross-section of same on line 7 7 of Fig. 10. Fig. 14 is a cross-section of same on line 8 8 of Fig. 10.

20 Figs. 15, 16, and 17 represent another modification of my invention. Fig. 15 is a longitudinal section of the lower part of a fountain-pen with the feed-rod partly in side elevation. Fig. 16 is a cross-section of same on line 9 9 of Fig. 15. Fig. 17 is a cross-section of same on line 10 10 of Fig. 15.

25 Figs. 18, 19, and 20 represent another modification of my invention. Fig. 18 is a longitudinal section of the lower part of a fountain-pen having the feed-rod partly in side elevation. Fig. 19 is a cross-section of same on line 11 11 of Fig. 18. Fig. 20 is a cross-section of same on line 12 12 of Fig. 18.

30 Figs. 21 and 22 represent the preferred form of pen detached. Fig. 21 is a plan view, and Fig. 22 is a cross-section on line 13 13 of Fig. 21.

In all the drawings similar parts are designated by similar letters.

35 Referring to the drawings, A designates the barrel of the ink-holder; B, a plug closing the upper end thereof; C, the point-section of the ink-holder joined to the barrel A in any suitable manner, the barrel A and the point-section C together constituting the ink-holder.

40 D designates the ordinary protecting-cap fitting upon the point-section and on the upper end of the ink-holder; *c*, the traversing-hole in the point-section; E, the pen; *e'*, the ink-aperture in the pen; F, the back-stay holding the pen in position; *f'*, the lip upon the back-stay extending down below the end of the point-section; *f''*, the check upon the lip to prevent it from going into the point-section; G, the air-inlet; *g*, the back-strip provided in the air-inlet extending along the back of the pen; H, the sub-chamber occupying all the space below the pen; I, the feed-rod held in said chamber H; K, the feed-tongue adjacent to the pen and integral with the feed-rod; L, an ink-conduit for conducting ink to the point of the pen; M M, inkways on each

side of the feed-rod between it and the sides of the sub-chamber, through which ink may pass from the ink-holder toward the end of the point-section; N, the vacancy or space in the sub-chamber H below the feed-tongue K; O, a finger integral with the feed-rod and extending down into the vacancy or space N; P, the narrow cleft or slot between the feed-tongue K and the finger O.

R is a groove in the feed-rod, forming the ink-passage communicating between the ink-holder and the vacancy or space N, which constitutes a receptacle below the pen; S, the ink-cup at the lower end of the sub-chamber H.

T T designate ink-spaces cut away on either side of the feed-rod and feed-tongue, and *u* designates the line which marks the upper end of the ink-cup S.

85 The barrel A may be constructed of any suitable material that will not be corroded by ink, either hard rubber or glass covered with sheet metal to protect it from breaking. The upper end thereof may be closed with a screw-plug, with a cork, or in any other suitable manner.

The point-section C may be of hard rubber and joined to the barrel A by a screw, or it may have on its upper end a smooth flange, which may be pushed into the barrel A, as into a socket, and the point-section may be constructed of glass or other material that will not be corroded by ink. The traversing-hole *c* may be the same diameter throughout, or it may be enlarged in diameter above the heel of the pen, or enlarged to a bell-shaped mouth at the lower end thereof. It is essential that the diameter of the traversing-hole *c* shall not be too large in order to prevent the fountain-pen from "leaking" when in use. About one-eighth of an inch or even less is the proper diameter.

95 The pen E may be of gold or other incorrodible metal or the ordinary steel pen. It should be constructed of such shape as when in position to leave a sufficient space back of it for the inflow of air into the ink-holder. It may be sloped smaller toward the heel, or it may be constructed with a shank, as represented in some of the figures, or its sides may be straight, as shown in other figures. Its sides should touch the wall of the traversing-hole *c* below the point of greatest diameter, so as to have a firm bearing upon the said inner wall.

100 The ink-aperture *e* in the heel of the pen may be a single slot, or it may consist of two or more slots through the pen or of a series of holes in the pen. The said aperture may be entirely within the point-section, or it may extend below the end of the point-section, or it may be dispensed with.

105 The back-stay F may fit the round of the traversing-hole *c*, and its inner portion next the pen may have a groove cut in it, or it may be cut away to fit the round of the pen, or it may be solid and of any shape—square or angular—that will hold the pen firmly in posi-

tion by its pressure upon the back thereof. The lip f' , integral with the back-stay F, may extend down to the slit in the pen, or it may be longer or shorter than this. It may be of the same width as the back-stay F, or it may be narrower, and its thickness back of the pen may be equal to the distance from the pen to the inner wall of the traversing-hole c , or it may be greater or less than this. The check f^2 , provided upon the lip f' , may be an enlargement on the lip to strike the lower end of the point-section, or it may consist of a pin firmly fixed in the lip for this purpose.

The air-inlet G may be a slot in the back-stay F, having its mouth open to the air in the upper side of the lip f' below the lower end of the point-section, or air may enter the ink-holder through air-inlets on either side of the back-stay F, or the air-inlet may be a groove in the lower side of the back-stay next the pen or a groove in the top side of the back-stay, or it may consist, as is represented in the preferred form of my invention, of both a groove in the lower side of the back-stay next the pen and a slot cutting through from the top side of the back-stay into the said groove, said slot having its opening to the air on the upper side of the back-stay below the point-section. The back-strip g may fit either tight or movably in the groove in the lower side of the back-stay F, or it may be dispensed with without material injury to my invention.

The feed-rod I is preferably round, but may be square or angular in form, or of any form that will cause it to hold firmly in the sub-chamber H and so support the feed-tongue K in contact with the pen, and at the same time so fill the sub-chamber H as to prevent the pen from leaking. It is desirable for the upper end of the feed-rod to extend above the point-section in order to facilitate manipulating it, and it may preferably extend up into the upper end of the barrel A to facilitate the flow of ink to the pen.

The feed-tongue K is preferably elongated by extending up into the sub-chamber H nearly to the heel end of the pen; but it may extend only to the lower end of the point-section, or it may extend up into the point-section beyond or above the heel end of the pen.

The ink-conduit L may be a small groove in the upper side of the feed-tongue and feed-bar for conducting ink to the point of the pen, or the contiguous surfaces of the pen and feed-tongue may form a capillary conduit for the flow of ink to the point of the pen.

The finger O may extend down to the lower end of the point-section or only part way down, or it may be dispensed with, as preferred.

The ink-passage R may be a groove in the side of the feed-rod communicating between the ink-holder and the slot P, or it may be a groove in the bottom side of the feed-rod

communicating between the ink-holder and the space N or the ink-cup S; or the feed-rod may be a tube, and the hole traversing it may be the ink-passage, with apertures in the side of the feed-rod communicating between the said hole and the lower part of the ink-holder.

Referring to Figs. 1 to 5, inclusive, I will describe the preferred embodiment of my invention. In this construction the ink-holder consists of a barrel A, and a point-section C joined to the lower end of the barrel by a screw. The pen E is here provided with an ink-aperture e' in the heel e thereof. The heel of the pen E fits into the traversing-hole c , the sides of the pen touching the wall of the traversing-hole below the central diameter thereof, so that the pen constitutes an arch with each side thereof, resting firmly against the inner wall of said hole in such a manner that the harder the pen is pressed upon its back the tighter it is held. The back-stay F presses firmly upon the back of the pen, so as to press it firmly down against the inner wall of the traversing-hole c . I have chosen the form of the back-stay F as combining efficiency with ease of construction; but the special office of the back-stay is to hold the pen firmly in position by pressure on its back, and at the same time to provide means for the regulated admission of air back of the pen into the ink-holder, either through it or on either side of it, and any form of back-stay that combines these two offices by pressing upon the back of the pen and admitting air into the ink-holder through it or on one or both sides of it will serve the purpose of my invention. The lip f' is integral with the back-stay F and extends from the lower end of the point-section down to near the slit in the pen. Its width and thickness is here the same as that of the back-stay F; but it has upon it the check f^2 , which is here an enlargement upon the lip f' , which by striking the end of the point-section prevents the lip f' from passing into the point-section. The air-inlet G is here formed by a longitudinal groove in the lower side of the back-stay F, together with a slot cut through the back-stay from the top side thereof through into the said groove and extending down into the lip f' , said slot opening to the air below the end of the point-section on the upper side of the lip f' , which opening is herein called "the mouth of the air-inlet." When the pen is held in position by the back-stay F, a sub-chamber H is formed beneath it. In this sub-chamber the feed-rod I, which is here cylindrical, is held between the pen and the bottom wall of the traversing-hole c and extends up into the upper end of the barrel A. The feed-tongue K is integral with the feed-rod I, being formed by cutting into the feed-rod with a tubular saw or in other suitable manner. The feed-tongue K is here lengthened by extending up into the sub-chamber H to a point

nearly to the heel end of the pen. The ink-conduit L is here formed in part by a small groove in the upper side of the feed-tongue and feed-rod, which, together with the adjacent surfaces of the pen and feed-tongue, conduct ink from the ink-holder to the point of the pen. The feed-rod I does not fill the sub-chamber H entirely, only touching at the top and bottom thereof and leaving vacant spaces on either side of the feed-rod, constituting the ink-ways M M. The whole space beneath the feed-tongue K in the sub-chamber H is designated "the vacancy-space N." The finger O, integral with the feed-rod I, is provided, extending down into the lower portion of said vacancy-space N. Between the finger O and the feed-tongue K is the narrow cleft or slot P. The ink-passage R is here a groove in the side of the feed-rod I, extending to the upper end thereof and communicating between the ink-holder and the slot P. T T designate ink-spaces cut away on either side of the feed-rod I and the feed-tongue K, extending, preferably, from above the heel of the pen to the lower end of the feed-tongue, though they may, if preferred, have a less extent. S designates the ink-cup, the upper end of which is marked by the line *u*. In this construction the ink-cup S comprises the vacant area below the line *u* in the sub-chamber H.

In operation according to this construction ink flows from the ink-holder directly to the point of the pen through two lines—first, through the ink-channel between the back-strip *g* and the pen; second, through the ink-conduit L, which is the main ink-line. Ink also flows from the ink-holder through the inkways M M on the sides of the feed-rod, through the ink-passage R into the cleft or slot P. Ink also feeds from the vacancy P and the inkways M M through the ink-spaces T T into the ink-conduit L, and so to the point of the pen. There is thus an abundant supply of ink to the pen feeding through different channels into the ink-conduit L below the pen, and special pains have been taken, on the one hand, to secure a regular free flow of ink to the pen and on the other hand to prevent leaking.

One important means of securing a regular free flow of ink is lengthening the feed-tongue by extending it up into the sub-chamber H, since its greater length increases its flexibility and its "pumping" power in causing a flow of ink; but this alone would not suffice if there were no ink around the feed-tongue in the sub-chamber H. If the sub-chamber H were dry, the flow of ink through the ink-conduit L would soon become interrupted and irregular.

The finger O exerts an important influence in my invention.

First. It increases the bearing of the feed-rod in the sub-chamber H and holds it firm.

Second. It keeps the sub-chamber H full of ink all around the feed-tongue and keeps the

ink-conduit L constantly supplied with ink. If the finger O were absent, the vacant space N would be so large it would not draw ink into it by capillary attraction; but the finger O so fills the space in the chamber or space N that the adjacent surfaces which formed the slot P and the ink-ways M M draw ink from the ink-holder by capillary attraction and the space N and slot P are always full of ink and keep the feed-tongue constantly supplied. This end is also greatly promoted by the ink-passage R, which, communicating directly between the ink-holder and the slot P, keeps the slot always full of ink.

Third. The finger O furthermore exerts an important influence in preventing the fountain-pen from leaking, as will hereinafter appear.

The flow of ink below the pen is so free in my construction that it is not at all necessary to form the ink-conduit L by means of a groove. The adjacent surfaces of the feed-tongue and pen form a capillary conduit that is quite as efficient as a groove and answers equally well all the purposes of the conduit. Indeed, the flow of ink below the pen is so free in my device that it is necessary to take precaution to prevent the fountain-pen from leaking. I secure this end by three features of construction:

First. It is necessary to this end to make the traversing-hole *c* in the point-section of very small diameter, as has been already mentioned. If said hole *c* were one-fourth of an inch in diameter, the fountain-pen would be sure to leak with this construction.

Second. I still further reduce the vacancy or space N below the feed-tongue by the construction of the finger O, which reduces the ink-spaces left below the pen to the dimensions of capillary contiguity which holds ink strongly by capillary attraction.

Third. I prevent leaking by limiting the supply of air to the ink-holder.

Air will always enter the ink-holder through the air-inlet G without at all interfering with or obstructing the line of ink-flow beneath the pen or the one above the pen. The inner or upper part of the air-inlet within the point-section may be widened into a groove, if it is found necessary, to allow the free passage of air into the ink-holder.

The inflow of air into the ink-holder may be diminished by pushing the back-stay F into the point-section as far as the check *f*² will allow it to enter, and the inflow of air may be increased with an increased flow of ink to the pen by drawing the back-stay farther out of the point-section.

I preferably limit the supply of air to the ink-holder in this construction by so far closing the open end of the groove in the lower side of the back-stay F and lip *f*' by the back-strip *g* that no air will enter there, but only through the mouth of the air-inlet on the upper side of the lip *f*'. The back-strip *g* thus

exerts a double office in my invention. It limits the inflow of air by partially closing the open end of the groove in the lower side of the back-stay F and it conducts ink to the point of the pen, and, furthermore, by its contact with the pen it causes ink from the feed-tongue K to pass through the slit of the pen and gather on the back thereof, so that aside from its conduction of ink the back-strip *g* increases the readiness and regularity of the feed of ink to the pen from the feed-tongue K.

The ink-aperture in the pen has an important office in my invention. Ink does not flow regularly through it to the point of the pen; but when the ink is exhausted in the sub-chamber H no more ink can enter the sub-chamber until a fresh supply of air enters the ink-holder, and there must be a strong vacuum in the ink-holder before the external air can force back the ink in the air-inlet in order to pass into the ink-holder. The ink-aperture *e* in the pen averts this conflict between the external air and the ink in the air-inlet, for as soon as the ink in the sub-chamber H is exhausted the ink in the air-inlet will feed through the ink-aperture *e* in the pen and flow to the point of the pen, thus readily allowing a fresh supply of air to flow into the ink-holder.

The lip *f'*, integral with the back-stay F, exerts several important offices in my invention. First, it facilitates the manipulation of the back-stay and the pen when the pen is to be removed or displaced; second, it supports the back of the pen; third, its lower end being solid holds the back-stay together, and, fourth, it allows the mouth of the air-inlet to be upon the upper side of the lip *f'* below the point-section.

The feed-rod I extends into the upper part of the barrel A to facilitate its manipulation, and also to facilitate the flow of ink from the ink-holder to the pen.

The ink-spaces T T facilitate the flow of ink from the slot P and the inkways M M to the ink-conduit L, and also facilitate its onward flow in the ink-conduit L from the end of the point-section to the point of the pen.

It will be seen that I provide a fountain-pen simple in construction and cheaply made, in which ink will flow readily to the point of the pen, but which will not be apt to "leak" in use, and in which the flow of ink to the pen can be regulated by regulating the flow of air into the ink-holder. The pen and feed apparatus may also be readily removed from the point-section for purposes of cleaning and all the parts may be readily reached and cleaned.

Various modifications of the structural details can be made without departing from the essential features of my invention.

The construction of fountain-pens shown in Figs. 6 and 7 coincides perfectly with the preferred form in respect of all the parts above the pen. Ink flows to the point of the pen

through the channel between the pen and the back-strip *g*, and air enters the ink-holder through the mouth of the air-inlet G, which is the same as in Figs. 1 to 5, inclusive; but in this construction there is no ink-aperture in the pen and no feed-tongue below the pen, the feed-rod I occupying the sub-chamber H merely in order to prevent leaking. This absence of the feed-tongue K with the ink-conduit L and other feed apparatus below the pen, with the absence of the ink-aperture within the pen, constitutes the only points of difference between this construction and the preferred form.

The construction of fountain-pens shown in Figs. 8 and 9 differs in several points from the preferred form. The only difference in the parts below the pen is that the ink-conduit L is not formed by a groove; but the adjacent surfaces of the feed-tongue and pen form a capillary conduit through which ink flows to the point of the pen. There are also two ink-apertures in the heel of the pen. Back of the pen there are several points of difference. The lip *f'* is dispensed with and there is no slot in the back-stay F, the air-inlet G being formed by the groove in the lower side of the back-stay F. In other respects this construction does not differ from the preferred form. In operation according to this construction ink flows to the point of the pen chiefly through the ink-channel below the pen and air enters the ink-holder through the air-inlet; but the air-inlet G is so stopped by the back-strip *g* that while air passes through it little or no ink will flow through it to the point of the pen. In this construction, therefore, the back-strip *g* chiefly serves to limit the supply of air to the ink-holder and to gather ink from the back of the pen by its contact therewith from the feed-tongue K. On the whole, the back-strip *g* will be better dispensed with in this construction, as the action will be better with a freer supply of air.

The construction shown in Figs. 10 to 14, inclusive, differs from the preferred form in several particulars, the differences in structure being that, first, below the pen there is but one difference—the finger O extends down to the end of the point-section—while above the pen there are several points of difference; second, there is no groove in the lower side of the back-stay, but the air-inlet G is formed by a slot in the back-stay and the lower end of the lip is solid, and there is no back-strip *g*, the back-stay F and the lip *f'* fitting to the round of the pen, and the check *f*² is a pin provided in the lip *f'*. In operation according to this construction ink flows from the ink-holder to the point of the pen in the channels below the pen, as in the preferred form, and air enters the mouth of the air-inlet, as in the preferred form, and flows into the ink-holder. In this construction the ink-aperture *e* in the pen exerts an important office in draining

the ink out of the air-inlet when more ink is needed in the sub-chamber H.

In all the figures of Sheet 2 the pen is without a shank, except in Figs. 21 and 22, which

represent the preferred form of the pen.

The construction shown in Figs. 15, 16, and 17 differs from the preferred form in several points, the structural differences in this case being that, first, the point-section is joined to the barrel A by a smooth flange inserted into the barrel as into a socket; second, there is no ink-aperture *e* in the pen, though it may be provided, if preferred; third, the back-stay F and the lip *f'* is not so wide as in the preferred form, leaving the spaces on each side of the back-stay above the pen larger than in the preferred form, and there is no groove in the lower side of the back-stay and no back-strip *g*; fourth, the feed-tongue K is longer than in the preferred form, extending up above the heel of the pen; fifth, the finger O only extends part way down to the end of the point-section, leaving a part of the vacancy N unfilled, and, sixth, the ink-conduit L is not formed by a groove, but the adjacent surfaces of the pen and feed-tongue K form a capillary conduit, in which ink flows by capillary attraction from the ink-holder to the point of the pen. In other respects this construction does not differ from the preferred form. Ink flows to the pen, as before, through the inkways M M, the ink-passage R, the ink-spaces T T, the slot P, and the ink-conduit L, and air enters the ink-holder chiefly, as before, through the air-inlet G, and also in less quantity through the side apertures on either side of the back-stay F.

The construction shown in Figs. 18, 19, and 20 differs from the preferred form in several particulars, the structural differences in this instance being that, first, the smooth flange on the point-section fits into the barrel A as into a socket; second, the back-stay F is a square piece having no groove in the lower side thereof and no slot through it, and air enters the ink-holder through the air-inlet G G on either side of said back-stay; third, the pen has no ink-aperture; fourth, the ink-conduit L is formed by the adjacent surfaces of the pen and feed-tongue, constituting a capillary conduit for the flow of ink to the point of the pen; fifth, the feed-tongue only extends up to the line *u*, and there is no finger O, and, sixth, the ink-passage R is a groove in the bottom of the feed-rod I. In this construction the pen is held in position, as before, by the pressure of the back-stay F, and ink flows from the ink-holder, as before, through the inkways M M, the ink-spaces T T, the ink-passage R, and the ink-conduit L, and air enters the ink-holder back of the pen through the air-inlet G on either side of the back-stay.

In all forms of construction in which it may be necessary air may enter the ink-holder through the inkways M M below the pen, and

where preferred the back-stay F may occupy the entire space above the pen and air may flow into the ink-holder below the pen, as aforesaid.

I have made an application for a patent for improvements in fountain-pens, filed May 6, 1892, Serial No. 432,054, in which are certain features similar to my present invention. In that application there is an ink-aperture in the heel of the pen, and below the pen is a feed-tongue integral with the feed-rod and elongated by extending up toward the heel end of the pen and provided with an ink-conduit, and below the feed-tongue is a finger integral with the feed-rod and having a slot between the feed-tongue and said finger; but in the construction shown in that application the ink passes to the point of the pen, chiefly through the ink-aperture in the pen, while in my present invention ink passes to the point of the pen chiefly through channels below the pen, the ink-aperture in the pen only serving to drain the ink out of the air-inlet G when the ink is exhausted in the sub-chamber H. In that application the pen is held in the stopper and the lip back of the pen is integral with the stopper, and the air-inlet is constructed in the stopper and lip. In that application the feed-rod and feed-tongue are held in a longitudinal hole in the stopper, and that application presents none of the peculiar features of my present invention, the pen held in position in the traversing-hole *c* by the pressure of the back-stay F, the air-inlet in the back-stay, the sub-chamber H, the inkways M M, and the vacant space N. I do not wish to claim anything set forth in that application, but only those features which are new and peculiar to this invention.

What I claim is—

1. In a fountain-pen, the combination of a barrel with a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, and a separate back-stay back of the pen provided with a lip integral therewith, and a stopper-check upon the lip to prevent it from entering the traversing-hole, and ducts and passages whereby air may enter the barrel and ink may flow out of the barrel to the point of the pen.

2. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, and a separate back-stay back of the pen provided with a lip integral with the back-stay, and an air-inlet in the back-stay and lip having the mouth thereof open to the air on the top side of the lip below the lower end of the point-section, and means to allow the outflow of ink from the barrel to the point of the pen.

3. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-

hole therein, a pen held in said traversing-hole, a back-stay located back of the pen provided with a groove in the lower part thereof next the pen, a back-strip held in said groove, and ducts and passages to allow the entrance of air into the barrel and the outflow of ink from the barrel to the point of the pen.

4. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end thereof and provided with a traversing-hole, a pen secured in said point-section, so as to partition the traversing-hole and form a sub-chamber below the pen, a separate back-stay to hold the pen in said point-section by its pressure upon the back thereof, and means to allow air to enter the barrel and ink to flow from the barrel to the point of the pen.

5. In a fountain-pen, the combination of a barrel, with a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole having the sides of the heel thereof in contact with the inner wall of the traversing-hole below the center thereof, a sub-chamber beneath the pen formed between the heel of the pen in contact with the wall of the traversing-hole and that part of the wall of the traversing-hole below the pen, a feed-rod held in said sub-chamber having the under side of the lower end thereof cut away to form a feed-tongue, a back-stay back of the pen, and means to allow the inflow of air into the barrel.

6. In a fountain-pen, the combination of a barrel, a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in the traversing-hole, a sub-chamber beneath the pen, a feed-rod held in said sub-chamber, and a back-stay back of the pen provided with a groove in the under side thereof next the pen, and a back-strip held in said groove in the back-stay, substantially as described.

7. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole provided with an ink-aperture in the heel thereof, a feed-tongue below the pen, and a separate back-stay back of the pen provided with an air-inlet therein communicating with the ink-aperture in the heel of the pen.

8. In a fountain-pen, the combination, with a barrel, a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, and a sub-chamber in the point-section underneath the pen, of a feed-rod having a portion cut away from the under side of the lower end of the rod to form a feed-tongue, a finger below the feed-tongue integral with the under side of the feed-rod, and a slot between the feed-tongue and finger, substantially as described.

9. In a fountain-pen, the combination of an

ink-holder consisting of a barrel and a point-section joined to the lower end thereof, said point-section provided with a traversing-hole therein, a pen held in said traversing-hole, and a sub-chamber in the point-section underneath the pen, with a feed-rod held in said sub-chamber having a portion cut away from the under side of the lower end of the rod to form a feed-tongue, a finger below the feed-tongue integral with the under side of the feed-rod, a slot between the feed-tongue and finger, and an ink-passage communicating between the ink-holder and the sub-chamber below the feed-tongue, substantially as described.

10. In a fountain-pen, the combination, with a barrel, a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, and a separate back-stay back of the pen, of a feed-tongue below the pen provided with ink-spaces cut away on each side thereof, substantially as and for the purpose set forth.

11. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, a separate back-stay back of the pen, a feed-rod below the pen provided with a feed-tongue integral therewith, a finger integral with the under side of the feed-rod located below the feed-tongue, an ink-cup below the pen, and means to allow the inflow of air into the barrel.

12. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in said traversing-hole, a separate back-stay back of the pen provided with a groove in the lower part thereof next the pen, and means whereby ink may flow out from the barrel to the point of the pen.

13. In a fountain-pen, the combination, with a barrel, and a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in the traversing-hole, and a sub-chamber below the pen, of a feed-rod held in the sub-chamber having a portion cut away from the under side of the lower end of the rod to form a feed-tongue and provided with an ink-passage communicating between the barrel and the sub-chamber below the feed-tongue, and means to allow the entrance of air into the barrel.

14. In a fountain-pen, the combination, with a barrel, of a point-section joined to the lower end of the barrel provided with a traversing-hole therein, a pen held in the traversing-hole, a sub-chamber below the pen, a feed-rod held in said sub-chamber having a portion cut away from the under side of the lower end of the rod to form a feed-tongue, said cut-away portion of the feed-rod extending up into the

sub-chamber, thereby lengthening the feed-tongue, and means whereby air may enter the barrel.

15. In a fountain-pen, the combination, with
5 a barrel, of a point-section joined to the lower
end of the barrel provided with a traversing-
hole therein, a pen held in said traversing-
hole, a sub-chamber below the pen, a feed-rod
held in said sub-chamber having a portion
10 cut away from the under side of the lower

end of the rod to form a feed-tongue, and means whereby air may enter the barrel.

Signed at New York, in the county of New York and State of New York, this 14th day of May, A. D. 1892.

LUCIEN B. WOOLFOLK.

Witnesses:

A. L. HALL,
M. V. BIDGOOD.