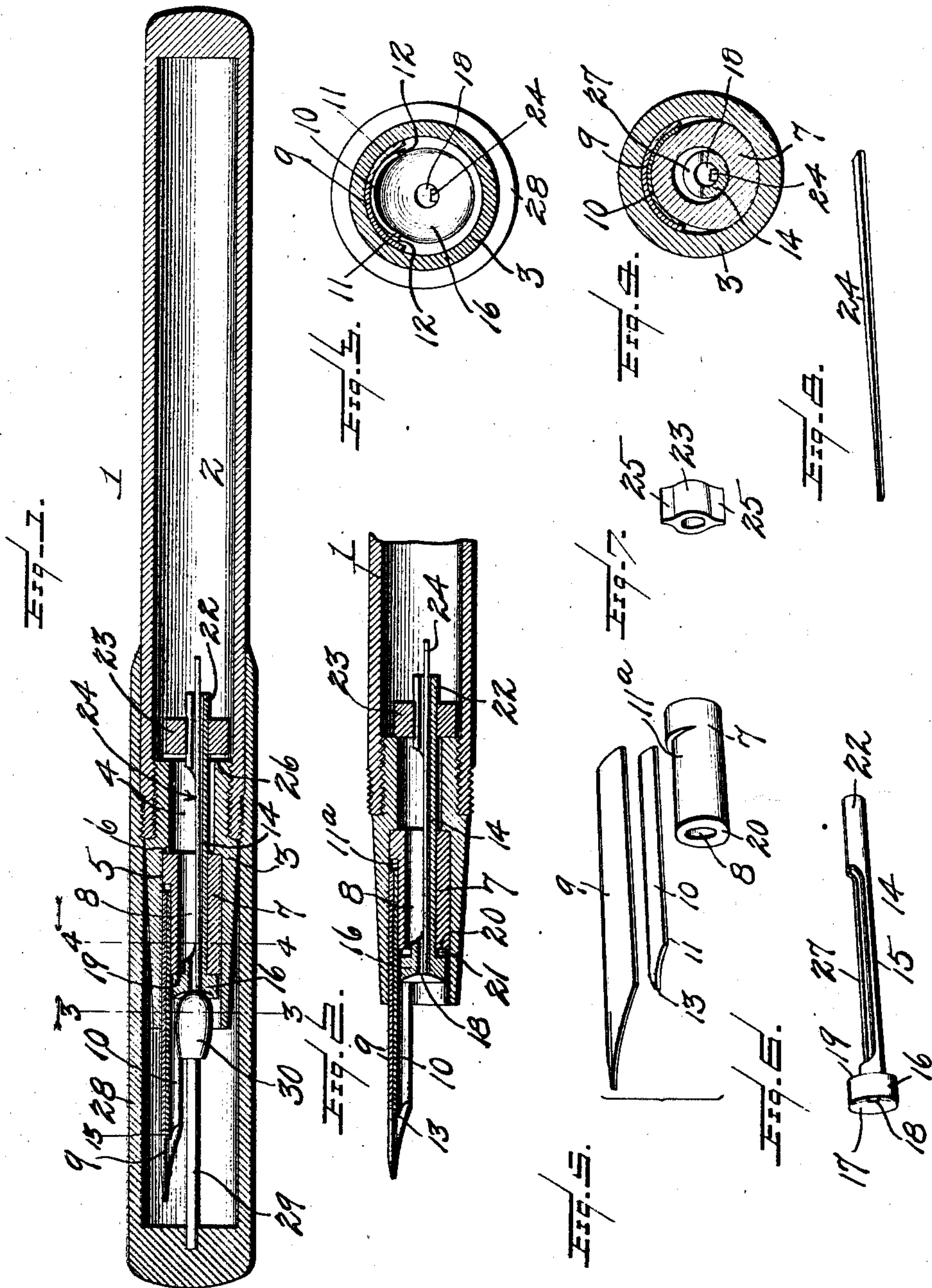


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WITNESSES:

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FOUNTAIN-PEN.

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To all whom it may concern:

Be it known that I, PAUL E. WIRT, a citizen of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented certain new and useful Improvements in Fountain-Pens, (Case A,) of which the following is a specification.

This invention relates to the subject of fountain pens, particularly of the type in which the ink is held in the reservoir by atmospheric pressure and fed to the pen point principally by capillary attraction, but more specifically the invention relates to that kind of fountain pens embodying what is known as the "safety cap" cooperating with the ink feeding means to insure a positive sealing or cutting off of the flow of ink when the pen is not in use and the cap is placed thereover.

It is therefore the purpose and object of the present invention to provide certain novel and practical improvements in the ink feeding means of a "safety cap" fountain pen, whereby a reliability and certainty of action may be maintained in the feeding or flow of the ink to the nibs of the pen point at all times while the pen is in operation, while at the same time cooperating with the pen cap in such a manner, that when the cap is secured over the pen, the same will effectually cut off the direct flow of ink to the pen point and thereby perfectly seal the ink within the reservoir, so that the pen can be carried in any position without leakage.

With these and many other objects in view, which will more readily appear to those familiar with the art as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated and claimed.

The essential features of the invention, involved in the specific improvements provided in the ink feeding means, and the cooperating elements of said ink feeding means and the safety cap, may be embodied in modified structures without departing from the scope of the invention, but a preferred embodiment of the latter is shown in the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view of a fountain pen constructed in accordance with the present invention and showing the

pen cap fitted over the pen for cutting off the flow of ink and sealing the latter in the reservoir. Fig. 2 is a similar view of one end portion of the fountain pen structure, illustrating the pen cap removed and the parts of the ink feeding device in open position for flowing ink to the pen point. Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1, the view omitting the cut-off button or cut-off projection carried by the pen cap. Fig. 4 is a cross sectional view on the line 4—4 of Fig. 1. Fig. 5 is a detail perspective view illustrating the writing pen point, the auxiliary metallic feed plate, and the tubular holding plug in separated relation. Fig. 6 is a detail in perspective of the longitudinally movable plunger feeding stem. Fig. 7 is a detail in perspective of the stop collar which is detachably fitted to the inner end portion of the plunger feeding stem. Fig. 8 is a detail in perspective of the wedge shaped supplemental regulating feed bar.

Like references designate corresponding parts in the several figures of the drawings.

The present invention embodies in its general organization the usual reservoir holder 1, the interior chamber of which constitutes the usual ink reservoir 2, and one end of the said holder is designed to have suitably fitted thereto the pen bearing section or nozzle 3. The pen bearing section 3 has the usual passageway or bore 4 there-through, and according to the present invention, it is designed to accommodate therein various parts of the ink feeding device, including the means for holding or fastening the pen point in position. In this connection, it will be observed that the passageway 4 through the pen bearing section is counterbored or enlarged, as at 5, producing an interior abutment shoulder 6 against which bears the inner end of the holding plug 7. This holding plug 7 is of a tubular form to provide a longitudinal circulating opening 8 therethrough, and is snugly fitted in the counterbored or enlarged portion 5 of the pen bearing section 3 to provide for accommodating and supporting certain parts of the ink feeding device, as well as for securely holding in place, in proper operative relation, the writing pen point 9, and the auxiliary metallic feed plate 10, which is directly associated therewith.

To properly perform this holding or fastening function, the tubular holding plug 7 is channeled on one side of its periphery to form a longitudinally arranged plate seat 11^a which conforms in curvature to the heel of the pen point 9 and the plate 10, and snugly receives therein such elements as plainly shown in Figs. 1, 2 and 4 of the drawings. When the parts are fitted in place, the pen point 9 and the feed plate 10 are arranged in parallel superposed and contacting relation, with their inner end portions snugly and tightly held between the exterior surface of the holding plug 7 and the inner wall of the pen bearing section 3; or in other words, the said pen point 9 and the feed plate 10 may be said to be clampingly held together and against the inner wall of the pen bearing section by the plug 7, which in turn, by this same clamping action, is securely held in its operative position.

The writing pen point 9 is of the usual form and preferably is a gold pen point, such as ordinarily employed in the best types of fountain pens, while the auxiliary metallic feed plate 10 is really in effect a secondary smaller pen point, having only a feeding action, but being approximately in the form of the main pen point. Referring more particularly to this auxiliary metallic feed plate 10, it is to be noted that the same preferably consists of a thin non-corrosive strip of metal, as of gold, and shorter in length and narrower in width than the writing pen point 9. Also, it is preferable that the said auxiliary feed plate 10 be made concavo-convex in cross section, like the writing pen point, but struck on the arc of a smaller circle so that the side edge portions 11 of the said feed plate 10 do not directly contact with the under side of the pen point, but leave intervening ink flowing fissures 12, as may be plainly seen from Fig. 3 of the drawings. Furthermore, the under auxiliary feed plate 10 is preferably formed with a rounded or pointed outer extremity 13 to assist in properly flowing ink to the nibs of the writing pen point.

The auxiliary metallic feed plate 10 above referred to constitutes a part of the ink feeding means or device, which latter also includes, as a necessary element thereof, a longitudinally movable plunger feeding stem 14. This plunger feeding stem 14 is preferably of the form shown in Fig. 6 of the drawings, viz: consisting essentially of a tubular body portion 15 formed at one end with an enlarged cylindrical feed head 16 having in its outer side a concaved seat 17 and pierced centrally by an air vent hole 18 in communication with the longitudinal opening through the body portion 15. At the side opposite its concave seat 17 the feed head 16 presents a capillary wall 19 oppos-

ing the corresponding wall or end 20 formed at the outer end of the interior holding plug 7 so that when the two walls 19 and 20 are separated, as shown in Fig. 2, there is provided between them an ink flowing fissure 21 which is in communication with the under side of the feed plate 10, as well as with the circulating opening 8 through the plug 7 and with the passage or opening through the stem 14.

The tubular body portion 15 of the feeding stem 14 is provided at its inner end with what may be termed a longitudinally slit holder sleeve 22 on the exterior of which is fitted a stop collar 23 and which receives therein the wide inner end portion of the longitudinally tapering or wedge shaped supplemental or regulating feed bar 24 which extends through the longitudinal bore of the feeding stem 14, and the small end or outer tip of which bar 24 lies within the air vent hole 18, but at one side of the center of such hole. In this connection, it is important to note that the outer end or tip of the feed bar 24 projects substantially through the air vent hole 18, but lying to one side of the center of the same, as shown in Fig. 3, serves to draw or drop the ink within the reservoir down to the mouth of the orifice or vent 18, thus maintaining at that point the actual ink supply to be drawn thence to the pen. It is at this point that the outward pulsations of ink and the inward passage of air occur, and it is very desirable to have this pulsating feature of the ink flow occur as far down toward the point of the pen as may be, as such arrangement better provides or insures a regular sensitive flow to the pen, affords easy writing, and best obviates flooding and blotting. As a matter of fact, the supplemental feed bar 24 is held so as to be at one side of the center of the longitudinal channel through the body portion of the feeding stem 14, in order to best secure the functions above indicated, and to drop the ink remaining about the pen and feeder, and within the open end of the pen bearing section, back within the reservoir as quickly as possible when through writing, so that the cap may be secured in place without leaving some ink outside of the reservoir and within the cap to be shaken off to soil the interior of the cap and the outside of the nozzle as the pen is carried about.

The stop collar 23 may be formed with winged projections 25, or the like, for engagement against an interior stop shoulder 26 within the holder, and said collar may be adjusted to any proper or desirable position upon the longitudinally slit sleeve 22 of the feeding stem. After this collar 23 is positioned, then the wedged shaped supplemental feed bar 24 is inserted with the result that the wide inner end of said supplemental

feed bar spreads and wedges in said sleeve 22, thus tightly holding the stop collar 23 in place.

The tubular body portion 15 of the feeding stem 14 is cut away longitudinally throughout most of its length as at 27 to provide what may be termed a longitudinal side venting opening so that there will be as little closure or obstruction within the circulating opening through the pen bearing section as possible, with the consequence that ink may gravitate more readily downward within the holder when through writing, and also that during the writing operation there may be as little attraction as possible within the pen bearing section above the air vent for ink to cling. A sufficient longitudinal movement is permitted the feeding stem 14 so that the feed head 19 may close against the end 20 of the holding plug 7, and also open away therefrom to provide the ink flowing fissure 21. It will also be observed that the feed head 19 loosely and slidably engages within and against the metallic feed plate 10, but this contact is sufficiently loose to admit of the capillary flow of ink about the head 16 and between the latter and the feed plate 10.

The cutting off of the ink flow and the sealing of the ink within the reservoir is accomplished by a cut-off projection carried by the pen cap 28, which cap is screwed or otherwise suitably engaged with the reservoir holder. In the present invention, this cut-off projection preferably consists of a supporting stem 29 carried within and by the cap 28 and having fitted to its free end a rounded or other suitably shaped cut-off button 30 which is drawn by the cap into and against the seat 17 of the feed head 16, and over the air vent 18. The closed position of parts is shown in Fig. 1 of the drawings.

A feature of special importance in the present invention is the metallic feed plate 10 and its coöperation with the head 16 of the feeding stem. The said feed plate constructed as shown, delivers the ink to the point of the pen more reliably because of its shape, and also because of its comparative thinness and lightness, while at the same time there is sufficient retentive attractive or cohesive force in said plate to retain the ink above the plate upon the nibs for facile writing, and generally speaking, the combination described in connection with the said feed plate provides for maintaining a better balance or equilibrium of the ink supply upon the nibs than has heretofore been possible with similar structures. A further function of the supplemental feed-bar, and not the least important, is that when the user of the pen is through writing and the pen is reversed to place the cap over the point, the supplemental feed-bar, arranged as shown,

readily attracts unused ink from about the pen and from the orifice, leading the same down within the nozzle, whence it is quickly drawn within the body or case or reservoir by the lead or attraction it provides in combination with the rear end of the plunger feeder and the button at rear end of plunger feeder. It is highly necessary to drop the ink, remaining about the pen and feeder and within the open end of the nozzle, back within the reservoir as quickly as possible when through writing, so that the cap may be screwed to place without sealing some ink outside of the reservoir and within the cap to be shaken off to soil the interior of the cap and outside of nozzle as pen is carried about. The utility of the best attractive means for this purpose cannot be over-rated. Before the cap reaches home in sealing or screwing to place, the ink remaining about the pen, as stated, should be drawn within the case as quickly as possible. This is accomplished by means of the specific construction of parts as shown, particularly the construction wherein the outer point of supplemental feed-bar lies at one side, and within a proper sized air-vent, its point being about even with the outer edge or rim of the vent.

It has already been pointed out that the stop collar 23 is so located and fixed as to provide for the desired extent of ink flowing fissure 21, but it may be further observed that the said collar materially aids as an attractive means to draw or drop the ink within nozzle and about the pen down within the reservoir quickly when through writing, and while the cap is being screwed to place to seal. The edges of said collar, constructed as shown, contact, or nearly contact, with the interior walls of the case proper. These edges being against, or nearly against, the interior wall of the reservoir or case serve to lead or attract ink remaining within the nozzle downward quickly when through writing. Otherwise, such ink would remain suspended or held within and about interior of nozzle, particularly as the offset formed by rear end of nozzle within the case acts as a great hindrance to quick backward flow or return of ink to reservoir.

With reference to the cut-off projection, it may be observed that the same is of such construction and arrangement as to attract a minimum amount of ink upon it and remain cleaner within the cap than similar projections heretofore employed.

In the operation of the pen it will be understood that as ink is withdrawn in writing, a globule of air is formed immediately within the mouth of the air-vent in the head. When such globule is rounded or formed it breaks away from the orifice or circular walls of the mouth of the air-vent and ascends up through and above the ink in reser-

voir, and a corresponding quantity of ink being released from atmospheric pressure pulsates down upon the pen to be written away. It will be noticed; therefore, that
 5 nicety of adjustment and construction as to feeding surfaces, or capillary attractive surfaces in conjunction with an air-vent of proper size, shape, and location must be provided to insure the best results, and the
 10 present invention takes these conditions into consideration along the most practical and effective lines.

Other advantages for the improved construction described herein will be readily apparent to those skilled in the art without
 15 further description.

I claim:

1. In a fountain pen, a pen bearing section carrying a pen point, and an ink feeding device comprising an auxiliary metallic
 20 feed plate underlying the pen point and arranged with its edge portions separated from the latter, and means for flowing ink to said plate.

25 2. In a fountain pen, a pen bearing section carrying a pen point, and an ink feeding device comprising an auxiliary concavo-convex metallic feed plate underlying the pen point and having its edge portions separated therefrom to leave intervening ink
 30 flowing fissures, and means for flowing ink to said plate.

3. In a fountain pen, a pen bearing section carrying a pen point, and an ink feeding device comprising a concavo-convex
 35 metallic feed plate underlying the pen point and shorter in length and narrower in width than the same, said feed plate being also struck on the arc of a smaller circle than the
 40 pen point, and means for flowing ink to said plate.

4. In a fountain pen, a pen bearing section carrying a pen point, a metallic feed plate underlying the pen point, and a feeder
 45 extending through the pen bearing section and having a cylindrical feed head provided with an air vent and arranged to form an ink flowing fissure communicating with the feed plate.

50 5. In a fountain pen, a pen bearing section carrying a pen point, an auxiliary metallic feed plate underlying the pen point and having its edge portions separated from the latter, a longitudinally movable plunger feeding
 55 stem having a feed head slidably related to the feed plate and arranged to normally provide an ink flowing fissure communicating with said plate, and the pen cap carry-

ing a cut-off projection adapted to contact with the feed head and move the same to a
 60 cut-off position.

6. In a fountain pen, a pen bearing section carrying a pen point, an auxiliary metallic feed plate underlying the pen point and having its edge portions separated from
 65 the latter, a longitudinally movable tubular plunger feeder stem having a terminal feed head provided with an air vent and slidably related to the feed plate, said feed head in its feeding position being spaced
 70 from an adjacent wall to form an ink flowing fissure communicating with the feed plate, and a cap carrying a cut-off projection engaging with said feed head over the air vent therein.
 75

7. In a fountain pen, a pen bearing section carrying a pen point, an auxiliary metallic feed plate underlying the pen point and having its edge portions separated from
 80 the latter, a longitudinally movable plunger feeding stem extending through the pen bearing section and carrying a vented feed head cooperating with the feed plate to flow ink thereto, and the pen cap carrying a supporting stem provided at its free end
 85 with a cut-off button engaging against the feed head over the vent therein.

8. In a fountain pen, a pen bearing section carrying a pen point, and an ink feeding device having a tubular feeding stem
 90 extending through the pen bearing section and provided at its outer end with a terminal feed head having an air vent hole therein, and a supplemental regulating feed bar extending longitudinally through the feeding
 95 stem and having its outer terminal or tip disposed within the air vent hole, said feed bar lying at one side of the longitudinal center of the opening through the stem and said air vent hole.
 100

9. In a fountain pen, a pen bearing section carrying a pen point, and a longitudinally movable plunger feeding stem comprising a tubular body portion having at
 105 one end a feed head and at its other end a slit holder sleeve, a stop collar adjustably fitting upon said holder sleeve, and a wedge shaped feed bar wedging within said holder sleeve.

In testimony whereof I hereunto affix my
 110 signature in the presence of two witnesses.

PAUL E. WIRT.

Witnesses:

C. W. FUNSTON,
 E. H. TROXELL.