

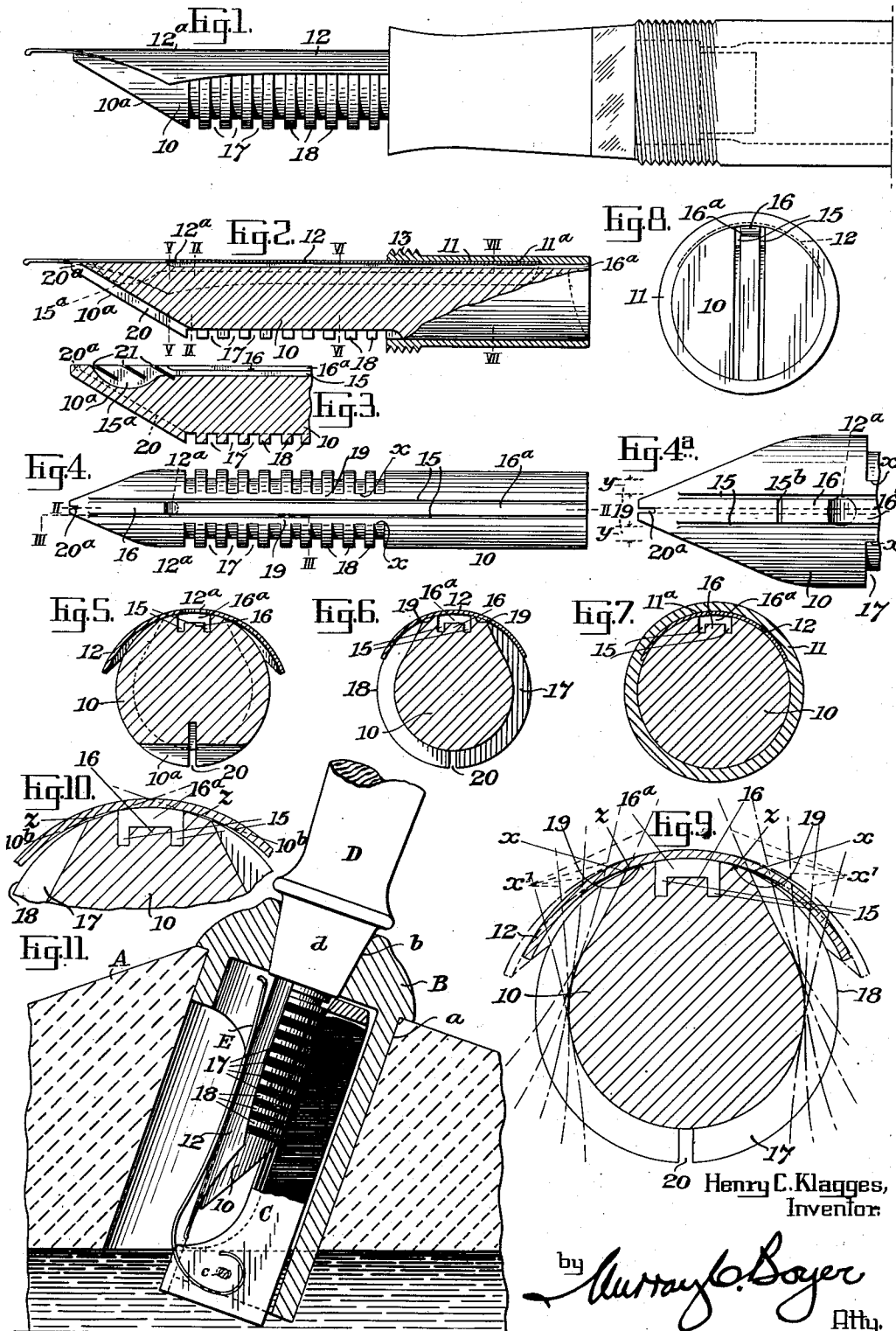
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FOUNTAIN PEN FEED

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## FOUNTAIN PEN FEED

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My invention relates to certain improvements in fountain pens and comprises an improved type of feed element, more familiarly known as a "feed bar," for employment or association with fountain and other forms of reservoir pens.

One object of my invention is to provide what may be termed a universal feed bar; available for use with fountain pens which include an ink reservoir which may be in the form of a rubber sac as well as for use with pens of the type more familiarly known as "single dip" pens wherein provision is made for the reception of a relatively large amount of ink so that such pens are adapted to write for a considerable length of time after a single dipping in a body of ink or proper contact with an ink supply.

A further object of my invention is to provide special means whereby any tendency of excess ink to pass to the pen point during use of a fountain pen such as may be occasioned by the fact that the heat of the hand tends to expand the air within the reservoir or ink sac, will be taken care of within the feed element.

A further object of my invention is to provide a construction of feed that will insure withdrawal of ink from the same into the reservoir or ink sac when the pen is placed in the pocket or when, for convenience, it is laid upon the desk, placed in a drawer of the same or otherwise disposed of temporarily; the cooling effect following use permitting the air within the pen and adjacent the ink supply to contract and allow return of the ink under the force of atmospheric pressure externally of the pen structure.

A further object of my invention is to provide a feed element with a special form of capillary groove (or grooves) on the upper surface of the same and underlying the pen point.

A further object of my invention is to provide a feed element of circular cross section, and to provide that portion of the same lying beneath the forward portion of the pen point with a plurality of semi-annular capillary spaces adapted to receive excess ink; such spaces being closely positioned in the form of a comb.

A further object of my invention is to provide a capillary groove on the underside of the feed element and lengthwise of the same, extending from the inner end of the comb portion to the forward end of the feed element directly underlying the nibs of the pen point; such capillary groove providing for communication between the several capillary spaces of the comb and the pen point.

A further object of my invention is to provide

an air space within the capillary groove (or grooves) on the upper side of the feed element, and to terminate such air space short of the forward end of the feed element.

A further object of my invention is to provide continuous surfaces or lands longitudinally of the feed element and directly underlying the pen point, which spaces are disposed laterally between the longitudinal groove (or grooves) on the upper side of the feed element and the upper and inner ends of the semi-annular capillary spaces which form the comb.

A further object of my invention is to provide a form of feed element especially available for use with tubular supporting means which receives such feed element and a pen point associated therewith in what has come to be known as a "unit insert"; such insert being received into the pen section of fountain pens of the reservoir or sac type, as well as the holders of "single dip" pens.

And a still further object of my invention is to provide a feed element that will take such care of the ink supplied from the sac or other reservoir as to prevent leakage.

These and other features of my invention are more fully set forth hereinafter; reference being had to the accompanying drawing, more or less diagrammatic in character, in which:

Figure 1 is a longitudinal side elevation of a portion of a fountain pen and the novel form of feed element embodying the features of my invention employed therewith.

Fig. 2 is a longitudinal sectional elevation of the feed element and a pen point associated therewith, and a carrier for the feed element and the pen point; such view being taken on the line II—II, Fig. 4.

Fig. 3 is a fragmentary sectional elevation of the forward portion of the feed element taken on the line III—III, Fig. 4.

Fig. 4 is a plan view of my improved feed element.

Fig. 4<sup>a</sup> is a fragmentary plan view of the forward part of the feed element on a larger scale; showing a detail of my invention.

Figs. 5, 6 and 7 are cross sectional views on an enlarged scale, taken on the lines V—V, VI—VI and VII—VII, Fig. 2, respectively.

Fig. 8 is a rear elevation, on an enlarged scale, of the feed element and its carrier.

Fig. 9 is a cross sectional view greatly enlarged and illustrating details of my invention, taken on the line IX—IX, Fig. 2.

Fig. 10 is a fragmentary sectional view in the

same plane as Fig. 9, illustrating a further detail of my invention, and

Fig. 11 is a fragmentary sectional view showing the manner in which my improved feed element may be employed in a so-called "single dip" pen, and wherein the supply of ink is delivered to the feed element by capillary means.

Referring to the drawing, and more particularly to Fig. 2, the feed element or bar embodying my invention is indicated at 10, and this is shown as received into a tubular carrier or support, indicated at 11, with a pen point 12 overlying the feed element and with its rear portion also received into the carrier 11, which may be recessed at 11<sup>a</sup> for its reception. This complete structure constitutes what is known as a "unit insert," and is received into the pen section or barrel of a fountain pen, or into a socket at the end of a penholder of the single dip type; the carrier being threaded at 13 for engagement with the threaded end of the pen section or pen barrel, or the socket of the penholder.

As clearly indicated in the drawing, the feed element 10 is a bar of circular cross section, and its forward end is preferably cut away diagonally, as indicated at 10<sup>a</sup>, so as to avoid contact with the surface written upon. Its rear end is preferably flush with the end of the tubular carrier 11 and its forward end, which is relatively pointed in plan as indicated in Fig. 4, underlies the forward end or nibs of the pen point 12.

The upper side of the feed element 10 is provided with capillary means for feeding ink to the pen point; in the present instance such means being in the form of a pair of grooves 15 which may be positioned or spaced in the manner indicated and provide between them a rib 16. The forward end of the capillaries 15 may be deeper, as indicated at 15<sup>a</sup>; the function of such deeper part being to accommodate a small supply of ink, and this portion of the feed element may be provided with one or more cross passages, more particularly described hereinafter, which cut through the rib 16. The rear portion of this rib is reduced, as indicated at 16<sup>a</sup>, and such reduced portion may begin at or approximately at a point just forward of the pierce hole 12<sup>a</sup> of the pen point 12 and extend to the rear end of the feed element to provide an air space communicating with the ink supply within the pen barrel reservoir or sac.

The portion of the feed element directly underlying the pen point is provided with a plurality of semi-annular capillary grooves 17, of uniform depth, which may commence at or approximately at a point opposite the pierce hole 12<sup>a</sup> of the pen point. With the separating ribs 18, these capillary grooves 17 provide a comb for the reception of ink which may pass from the longitudinal capillaries 15 of the feed element underlying the pen point in the operation of use; such use including the flexing of the pen point, if at all, in the writing operation. The spaces 17 are true capillaries and their width is such as to insure this condition. Their number may be anything desired and the comb preferably extends from the outer end of the carrier 11 substantially to the forward end of the feed element.

The capillary spaces 17 are semi-annular, and they extend around the under portion of the feed element to the points *x* laterally of the longitudinal capillary grooves 15 on the upper side of the feed element. By stopping these semi-annular capillary spaces at such points, longitu-

nal surfaces or lands 19 are presented on the upper side of the feed element laterally of the longitudinal capillary grooves 15. The width of these surfaces or lands may be as indicated by the dotted lines *y*, just to the left of Fig. 4<sup>a</sup>. Their width may be varied, however, but is preferably not less than .030 thousandths of an inch; depending upon the transverse curvature of the pen point employed therewith.

In the usual manner of making my improved feed element, the surfaces or lands 19 follow the convex curvature of the same, as clearly illustrated in the enlarged sectional view, Fig. 9, and the association of a pen point with the feed element, as also indicated in such view, leaves a narrow and substantially wedge shaped space (or spaces) between the surface of the feed element and the under surface of the pen point, as indicated at *z*, laterally of the outer walls of the longitudinally placed capillary grooves 15 and the points *x* where the semi-annular spaces 17 stop, with the result that ink will find its way into said semi-annular capillary spaces 17 from the longitudinal capillary grooves 15 on top of the feed element. If desired, the area of the spaces *z* may be slightly increased by flattening the surfaces or lands 19, as indicated at 10<sup>b</sup>, Fig. 10. The capillary spaces 17 formed on the feed element may be made in any approved manner; one such operation being to cut the same by a saw or a gang of spaced saws, and the dotted lines *x'*, Fig. 9, represent successive positions of the saw (or saws) in a cutting operation. Other ways of providing these spaces is within the scope of my invention.

On the underside of the feed element I provide a longitudinal capillary groove 20, which may extend from the rear end of the comb made up of the capillary spaces 17 to the forward end of such feed element; being cut through at the point of the latter to the top, as indicated at 20<sup>a</sup>. This groove 20 affords communication between the capillary spaces 17 of the comb and the pen point.

It may be desirable, in order to facilitate proper feed of ink to the pen point, to afford communication between the capillary grooves 15 to or adjacent to the forward end of the feed element, and in Fig. 4<sup>a</sup> I have shown a cross passage 15<sup>b</sup> cut through the unreduced portion of the rib 16 and communicating with the deeper portions 15<sup>a</sup> of the capillary grooves 15. The position of this cross passage is forward of the pierce hole 12<sup>a</sup> of the pen point, and while I have illustrated a single cross passage, a plurality may be employed, if desired or necessary.

In the production of fountain pens and more particularly in connection with the completion of the unit elements with which my improved feed element is especially available, it is desirable and usually necessary to set the feed element with respect to the pen point to secure such nicety of the relation of the feeding capillaries that will insure proper delivery of ink to the pen point. The pen points are usually flat throughout their longitudinal axis, and the drawings herewith illustrate a pen point lying in a single plane. It does happen at times that, due to some elasticity of the metal employed or other factors, the pen points present a slight arch longitudinally of the same and if nothing were done in the utilization of such pen points, the under surface of the same might stand too far away from the upper surface of the feed element. In the setting of the latter with respect to pen points of such type, it may be desirable to increase the flexibility of the end

of the feed element in order that it may be brought into the desired contact with the pen point. With a view of increasing the flexibility of the outer end of the feed element and facilitating its setting with respect to the pen point, such end may be diagonally notched as indicated at 21 in Fig. 3. In the present instance three such notches are shown although it will be understood that more or less may be provided as may be found necessary or desirable. If slots such as those indicated at 21 are employed, it may be unnecessary to provide the cross passage 15<sup>b</sup>, shown in Fig. 4<sup>a</sup>.

In addition to use with a fountain pen of the usual type having a supply of ink within the pen barrel or within a rubber sac contained therein, the improved feed element constituting the subject of my invention may be employed in connection with capillary ink-supplying means such as disclosed in the pending application of Harry C. Kofke and Henry C. Klagges, filed August 3, 1940, Serial No. 350,320; the comb of the same being adapted to receive ink from the capillary ink-supplying member disclosed in such application. To illustrate the application of my improved feed element I have shown in Fig. 11 the manner in which it may be employed with a capillary ink-supplying member. In this view, A represents the top of an inkwell having an opening *a* receiving a carrier B, which may be tubular, in which an ink-supplying capillary member, indicated at C, is mounted on a pivot *c*. This member is slotted at *c'* and, as in the application for patent referred to, it is maintained in position to engage the feed element 10 when the latter, with a pen point, is mounted in the end of a penholder. The penholder is shown at D and has a tapered end *d* to loosely fit the socketed end *b* of the carrier B; the showing of the drawing being wholly diagrammatic. The carrier B is provided with a spring E arranged to bear against the pen point and through such action press the feed element 10 against the slotted surface of the capillary member C. By preference, such surface is concaved so as to more nearly fit the arcuate engaging portion of the feed element. By this arrangement, the feed element receives a supply of ink from the capillary member C, such supply filling the combs of the feed element and delivering to the pen point mounted over the same; passing from the combs over the longitudinal surfaces or lands 19 of the feed element to the capillary grooves 15 directly underlying the pen point and feeding the latter with ink during the operation of writing. Due to capillary attraction, this ink will be retained by the combs until completely consumed in the act of writing and a further supply may be secured by placing the feed element in contact with the capillary ink-supplying member C as indicated in Fig. 11, or as set forth in said pending application.

In the use of a fountain pen equipped with my improved feed element, the ink from the reservoir or sac within the barrel of the fountain pen passes via the capillary grooves 15 to the point of the pen and is consumed in the act of writing; air to take the place of the ink supplied passing via the space provided by the reduced portion of the rib 16 disposed between said capillary grooves 15. If the heat of the hand tends to expand the air within the reservoir or sac of the fountain pen, there may be an excess amount of ink passing to the pen point and not immediately consumable in the act of writing. In

such case this excess ink passes laterally away from the pen point over the surfaces or lands 19 and into the semi-annular spaces of the comb whose capacity is sufficient to receive and hold a considerable amount of ink that would otherwise leak or spill from the writing point of the pen, and these spaces gradually fill up with this excess ink; such action being aided by the presence of the longitudinal capillary groove 20 on the under side of the feed element.

It will be observed, upon reference to the enlarged sectional view, Fig. 9, that the pen point, although resting upon the feed element along the longitudinal central portion thereof is, by reason of its transverse curvature, spaced away from the same along the longitudinal surfaces or lands 19 between the points where the semi-annular capillary grooves or spaces stop and the outer walls of the longitudinal capillary grooves 15, with the result that ink will find its way into said semi-annular grooves or spaces and be held there; such condition accounting for the acceptance and retention of such excess ink as may flow from the supply within the barrel or sac of the fountain pen due to the heating of the air adjacent to such supply. When the act of writing is ended for the moment and the pen is placed in the pocket or even when the pen is laid upon the desk or otherwise disposed of temporarily and the heat of the hand dissipated, the contraction of air within the barrel reservoir or sac permits the atmospheric pressure externally of the pen structure to carry the ink back from the semi-annular spaces 17 into the capillary grooves 15 of the feed element and thence to the supply within the reservoir or sac.

It will be understood therefore that the presence of these semi-annular capillary spaces partially circumferential of the forward part of the feed element retains the excess ink passing from the reservoir or sac of the pen and holds the same in readiness for use and without danger of leakage from the end of the pen point; such spaces cooperating with the longitudinal capillary grooves 15 on top of the feed element which deliver ink to the pen point and the longitudinal capillary groove 20 on the under side of the feed element affording communication between the semi-annular spaces 17 of the comb.

While I have shown and described with some particularity the construction and operation of my improved and novel feed element, it will be understood that modifications may be made in the same without departing from my invention; all of which is deemed to be within the scope of the appended claims.

I claim:

1. A fountain pen including a feed bar having a shank portion adapted to be mounted within the same at the end of its barrel and an extending nib-supporting portion; said feed bar being provided with a capillary feed passage on its upper side communicating at one end with the writing fluid reservoir of the barrel and at the opposite end with a pen point supported on said feed bar, a plurality of spaced transversely extending combs semi-annularly arranged on the under portion of said feed bar and beneath the nib-supporting portion thereof, and a capillary groove on the under side of the feed bar extending longitudinally thereof from the rear portion of said combs to the forward end of the bar and affording communication between said combs.
2. A structure as set forth in claim 1, with the capillary groove on the under side of the feed

bar extending along the same to and communicating with the forward end of the pen point.

3. A structure as set forth in claim 1, with the upper termini of the spaces between the combs laterally spaced from the capillary passage on the top of said feed bar.

4. A fountain pen including a feed bar having a shank portion adapted to be mounted within the same at the end of its barrel and an extending nib-supporting portion; said feed bar being provided with a plurality of longitudinal feed passages on its upper side communicating at one end with the writing fluid reservoir of the barrel and at the opposite end with a pen point supported on said feed bar with the latter portion of said passages more deeply recessed, a plurality of spaced transversely extending combs semi-annularly arranged on the under side of said feed bar and beneath the nib-supporting portion thereof, and a longitudinal capillary passage on the under side of the feed bar affording communication between said combs.

5. A structure as set forth in claim 4, with the capillary passage on the under side of the feed bar extending along the same to and communicating with the forward end of the pen point.

6. A structure as set forth in claim 4, with a cross passage between the longitudinal capillary feed passages on top of the feed bar and located forward of the position occupied by the pierce hole of the pen point associated with said feed bar.

7. A fountain pen including a feed bar having a shank portion adapted to be mounted within the same at the end of its barrel and an extending nib-supporting portion; said feed bar being provided with a capillary feed passage on its upper side communicating at one end with the writing fluid reservoir and at the opposite end with a pen point supported on said feed bar, a plurality of spaced transversely arranged combs semi-annularly disposed on the under portion of said bar and beneath the nib-supporting portion thereof; there being longitudinal surface spaces on the upper side of the bar between the capillary feed passage and the termini of said combs, and a longitudinal capillary passage on the under side of the feed bar affording communication between said combs.

8. A structure as set forth in claim 7, with the capillary passage on the under side of the feed bar extending along the same to and communicating with the forward end of the pen point.

9. A structure as set forth in claim 1, with the forward end of the feed bar diagonally slotted to provide resiliency and facilitate setting with respect to the pen point employed therewith.

10. A structure as set forth in claim 4, with an air passage on top of the feed bar formed by reducing the rib lying between the longitudinal capillary passages rearward of the position occupied by the pierce hole of the pen point.

11. A unit element for use with reservoir pens comprising a tubular supporting member arranged for threaded engagement with a penholder, a feed bar of circular cross section having a shank portion supported in said tubular member, a pen point overlying said feed bar and fitting

a recess within said tubular support; said feed bar having a capillary passage on its upper side partially enclosed by said tubular support and communicating with an ink supply and extending beneath the pen point, a plurality of spaced transversely extending combs semi-annularly arranged on the under portion of said feed bar and beneath the nib-supporting portion thereof, and a capillary groove on the under side of the feed bar extending longitudinally thereof from the tubular support to the forward end of the feed bar and beneath the pen point and affording communication between said combs.

12. A structure as set forth in claim 11, with the capillary groove on the under side of the feed bar extending along the same to and communicating with the forward end of the pen point.

13. A fountain pen including a circular feed bar having a shank portion adapted to be mounted within the end of its barrel and an extending nib-supporting portion; said feed bar being provided with a capillary feed passage on its upper side communicating at one end with the writing fluid reservoir of the barrel and at the opposite end with a pen point supported on said feed bar, a plurality of spaced transversely extending combs semi-annularly arranged on the under portion of said feed bar and beneath the nib-supporting portion thereof, and a capillary groove on the under side of the feed bar extending longitudinally thereof from the rear portion of said combs to the forward end of the feed bar and affording communication between said combs and the forward end of the pen point.

14. A feed bar for use with reservoir and/or fountain pens comprising a member of substantially circular cross section having a shank and a pen-point-supporting portion, and ink storage spaces underlying the pen-point-supporting portion and comprising semi-annular grooves of capillary dimensions and uniform depth, with an ink-supplying passage longitudinally of the feed bar on the upper side of the same, and a capillary groove longitudinally disposed on the under side of the feed bar and affording communication with the ink storage spaces.

15. A structure as set forth in claim 14, with the capillary groove on the under side of the feed bar extending along the same to and communicating with the forward end of the pen point.

16. A feed bar for reservoir pens comprising an elongated member of circular cross sectional contour having a shank and a pen-point-supporting portion, ink storage spaces formed in said elongated member and directly underlying the pen-point-supporting portion; said spaces comprising semi-annular capillary grooves, and capillary means on the under side of said elongated member affording communication between said ink storage spaces.

17. A structure as set forth in claim 16, with the means affording communication between said ink storage spaces extending to and providing communication with the forward end of the pen point.

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