

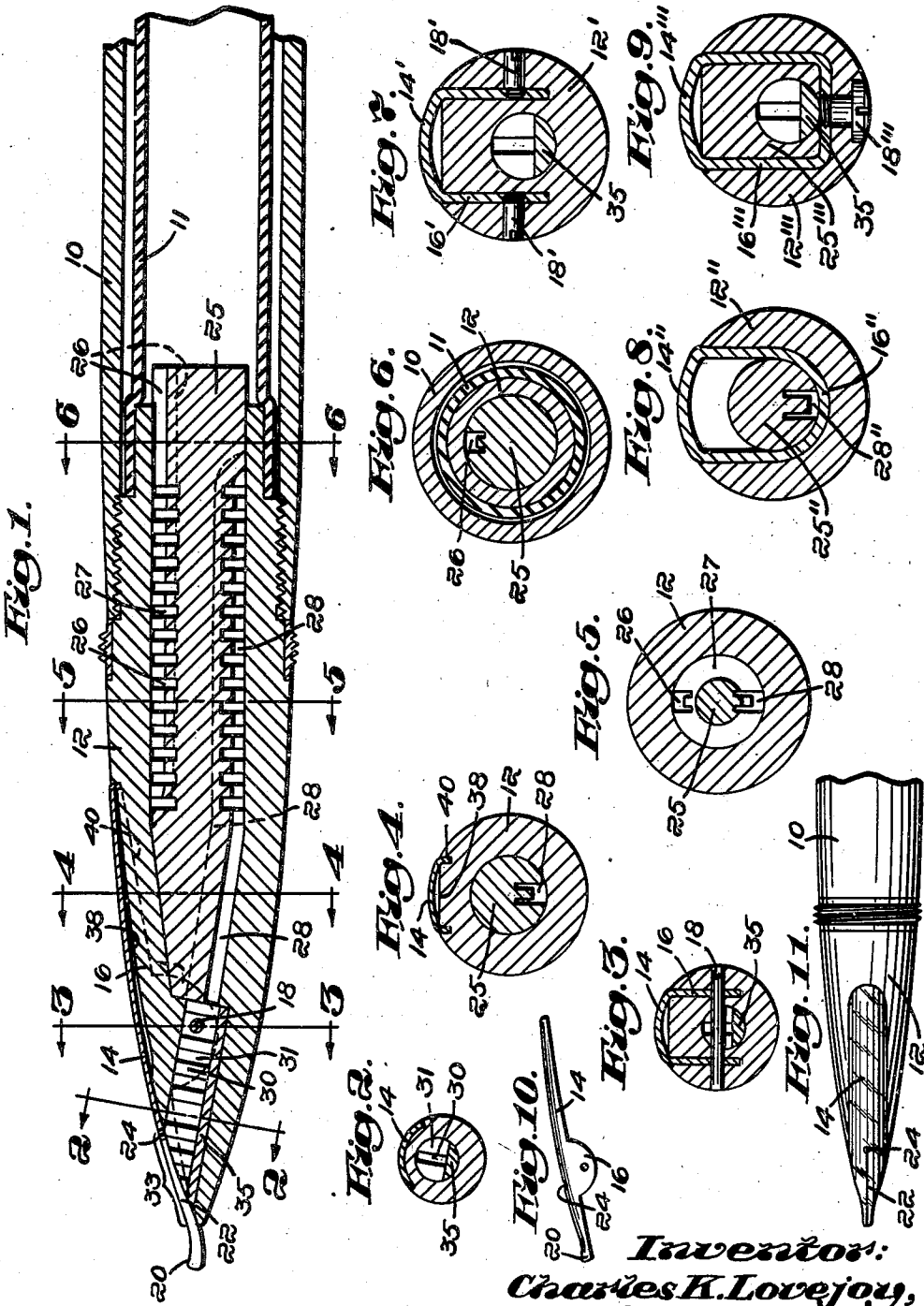
Dec. 9, 1947.

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2,432,112

FOUNTAIN PEN

Filed April 12, 1945



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UNITED STATES PATENT OFFICE

2,432,112

FOUNTAIN PEN

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Application April 12, 1945, Serial No. 587,893

15 Claims. (Cl. 120—50)

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This invention relates to improvements in fountain pens.

More particularly, it discloses a pen point, and mounting means comprising a pen-and-ink-holding barrel having a tapering end section which holds the pen point, preferably supporting it at an angle to the axis of the barrel. The pen point may have its writing extremity positioned actually at the axis of the barrel, but the angular departure of the body of the point from the axis of the barrel provides room in the tapering part of the barrel for a terminal capillary reservoir underlying the body of the pen point, and room for rigid thick barrel walls surrounding the reservoir and all of that portion of the feed which usually heretofore has been protuberant from the barrel. The barrel thus secludes from atmosphere the reservoir and all of the terminal portion of the feed, while the resilient writing tip of the pen point is a lid that covers the orifice—and normally closes it, except as to such ink and air as pass through it in the act of writing.

The invention thus provides for avoiding ink evaporation, without incidentally abridging any useful function of the pen. It achieves an improvement in stand-by readiness for instant writing. It accomplishes this without annoying wastage of ink; without risk of ink occasionally becoming transferred to the outside of the finger grip; and without obstructing the full and free using of a flexible writing point; while permitting that the ink feed and control system may be of an efficient, freely flowing anti-flooding type.

The combination herein to be described solves satisfactorily a problem which has puzzled the makers of fountain pens for many years, and eliminates an evil that has annoyed fountain pen users ever since fountain pens first were made.

In conventional pen holders the end face of the stem has an arcuate socket to receive the heel of an arcuate metal pen. Such a metal pen, as a whole often called a "nib," is herein called a pen-point, or merely a "point," whose tapering slitted resilient writing portion is its "tip." In a conventional fountain pen the "pen section" of the barrel has an endwise-projecting bar, called the "feed," which stands in and under the arcuate hollow of the point, and has a longitudinal ink-feeding channel with a number of transverse capillary grooves. These grooves together constitute a local or terminal reservoir to hold any excess of ink that may come down through the channel, and to assure the presence of a body of ink in capillary proximity to the slit or cleft of the tip, so that, for writing, ink will stand in

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capillary continuity from the feed channel through the slit to the extremity of the tip.

The said evils are, that sometimes this capillary continuity becomes broken, the ink having dried out, so that it is difficult to start its flow for writing. Another is that sometimes ink is unexpectedly found on the outside of the pen section of the barrel, where it soils one's fingers, and may cause other trouble. And still another is that sometimes the pen is unexpectedly found empty of ink, although it has been used but little.

Heretofore, in efforts to maintain the said capillary continuity, it has been proposed to enclose the whole of the point and its tip within the pen section, except a terminal small fraction of the tip, and to feed the ink along capillary spaces on both sides of the entire length of the point, with connected circumferential capillary reservoir. But such a sandwiching of the point between stiff bars prevents a user of the pen from flexing the tip as he may desire, e. g., for making heavy lines, or for shading, etc.; and it makes even the most flexible of tips operate only and always as a stiff point. Also it has been proposed to give the local reservoir larger capacity, even making the pen point be so large that its shank has to be a tubular ferrule surrounding the pen section. But in so far as such devices maintain continuity of ink to the writing point, this is accomplished only at the expense of more rapid depletion of ink from the pen by evaporation. Amplification of the capillary terminal reservoir affords no solution of the problem how to avoid the other above said troubles.

By making the pen point end of the barrel taper to the axis of the barrel, and by mounting the pen point on the exterior surface of the barrel, with its main body, i. e. its shank and most of its tip, lying on one side of the taper, I achieve a structure in which, (a) the native flexibility possessed by the pen point is wholly available to the user; (b) the objectionable, but hitherto customary, protuberance of the feed bar and pen point from the squared off end of a barrel is avoided; (c) a cross sectional interior dimension of the shell of the barrel is provided, large enough to contain a capillary auxiliary reservoir adjoining the slit of the writing tip; and (d) all ink held, whether in this reservoir or elsewhere, is secluded from atmosphere, except where the point flexes in the act of writing.

The use of an ordinary arcuate shape for the shank of the pen point, secured on the exterior of the tapering barrel, makes it possible to design the cross section of the taper of the barrel in any

of a variety of forms, e. g. in a smooth bulging taper down to the writing extremity of the tip. This discovery is the final but essential step in achieving a fountain pen structure of symmetrical "stream line" contour, including the point portion of the pen.

According to the present invention the pen section is constructed with a definitely circumscribed and closable sole orifice of its ink duct, and the pen point is so constructed, and is so mounted on the pen section, that its tip constitutes a lid covering that sole exterior orifice. Contained ink is thus completely secluded from atmosphere, except through the slit and the usual hole at its top, through which air can enter in the act of writing. The terminal capillary reservoir is in the enclosed portion of this duct, next to the orifice that is closed by the tip of the point. This is in contrast to pens whose terminal capillaries are exposed to atmosphere, where the whole area of capillary grooves constitutes the orifice of the ink duct and holds a large area of ink surface exposed to evaporation and dissipation in atmosphere.

The tip may have conventional taper, arcuate shape, slit and heart or round hole at the head of the slit, and any desired degree of resilient flexibility. The body of the point may have conventional arcuate shape; and, when in position on the surface of the pen section it may look like an ordinary point, although in fact its under surface has special features, as a marginal flange and two depending lugs for securing it in position.

The firm securement of this point body on the pen section may be accomplished in any of various ways. The point is not necessarily on the outside surface of the pen section as herein illustrated, but it is a feature, that, if desired, the point may be so carried and be invisibly secured there. For such a mounting, a slab is scarfed from the upper surface of the taper of the pen section to make a shallow recess for receiving the outline of the point's body with a marginal trench to receive a flange which is turned down at the edge of the body so as to fit into this recess and trench, to make the upper surface of the point flush with the adjacent upper surface of the point.

Ink in the pen has no access to the body part of the point. Forward of this socket the material of the section rises to contact with the under surface of the point, or a gasket (not shown) may be inserted if desired, to make a dam to prevent flowage of ink back from where the tip is covering the duct orifice. The body thus positioned may be fastened down securely by mechanical means, of which there may be many varieties. Specifically, the invention provides lugs, at the side edges of the mid-portion of the body, which depend into deeper parts of the said trench, into the midst of the pen section, and are held there by a transfixing pin whose ends are so inconspicuous as to be practically invisible. However, other means to secure the lugs may be used; and securing means other than those lugs may be used in substitution for them.

I ascribe the said troubles to evaporation of ink from the terminal reservoir. The breaking of capillary continuity of ink which occurs when a pen lies idle on a desk for a little while, and the emptying of the barrel other than by draft of ink in writing, are obviously due to evaporation. The transfer of ink to the surface of the finger grip may also be due to evaporation, as, when a capped pen is carried in one's breast pocket, vapor of ink produced by warmth of the

wearers' body may rise into the cap, condense there, and run down in liquid form to a lodgement on the outside of the pen section within the cap.

To eliminate the above said evils the invention provides an ink passage that is entirely enclosed, and is always closed, except at the slit as described. Although the flexible writing tip is a part of the enclosing means, there is nothing to restrict the yielding and spreading of the tip in writing, and so there can be full utilization of whatever flexibility a writer likes to have in his point. Meantime the ink contained in the feeding duct and its reservoir of capillaries at the tip is so completely enclosed that loss of ink by evaporation is inconsequential.

The pen section can be made with a conical taper; and in that case the point may be mounted on the taper with the extremity of its tip at the projected axis of the pen barrel. As the pen section has no function except to hold the point and to deliver ink to its tip, it is permissible to model the sides and under surface of the pen section in any contour that may be desired, either for exterior aspect or for providing large interior reservoir space.

The invention provides other advantages, among which are that the equipment of an individual pen barrel can be chosen among any of a variety of interchangeable points, to accommodate a customer's selection or change of flexibility, quality or other character. Other advantageous improvements are found in the fewness of parts and in their simplicity, with resulting low cost of manufacture.

It is intended that, by suitable expression in the claims, the patent shall cover whatever of patentable novelty exists in those parts of the disclosed improvement which pertain to the holding of ink secluded from atmosphere except at a sole terminal orifice and the structure and mounting of a pen point tip as a lid covering that orifice.

In the accompanying drawings, which represent an illustrative embodiment of the invention: Figure 1 shows a portion of a fountain pen, in side elevation, in medial longitudinal section;

Figures 2, 3, 4, 5 and 6 respectively are transverse sections of the same, seen in end elevation, on the lines of their respective numbers in Figure 1;

Figures 7, 8 and 9 are sections comparable to Figure 3, on a larger scale, respectively showing modifications of the Figure 3 means for holding the point firmly on the pen section of the barrel;

Figure 10 is a side elevation of the pen point which is in Figure 1, on a smaller scale; and

Figure 11 is a small scale plan of the portion of a fountain pen which is portrayed in Figure 1.

In the particular illustrative embodiment of the invention which is portrayed in Figure 1 the barrel 10 has a pen section 12 on whose exterior surface the pen point 14 is mounted firmly by means of two lugs 16, one at each side of the mid-portion of the body of the point. These, located as seen in Figure 11, have a contour indicated by the dotted line 16 in Figure 1. They depend into the pen section as seen in Figure 3, and are held by a transfixing pin 18 whose ends are inconspicuous at each side of the pen section. The pin may be a tight fit, held by friction, so as to be easily driven out to release the point. The pen section 12, which is screw mounted in the body of the barrel 10 carries the pen point 14 on its tapered forward surface, with the extremity 20 of the point standing where the axis of the pen barrel would be, if it were projected. The pen

point may be of gold or other suitable resilient metal, of conventional arcuate shape, having a tip which tapers in the ordinary way; and this tip constitutes a lid that covers the terminal orifice of the ink and air duct 25, 27, 28, 30, and also covers the local or terminal reservoir 31, preventing access of atmosphere thereto, except that when the pen is used in writing, and ink goes out through the slit 22, air can go in through the hole 24 to pass through the said duct to the barrel 10.

Ink is filled into and held in the barrel 10 in any suitable way, that which is portrayed being by providing a rubber sac 11 cemented tightly on the inner end of the pen section 12, as is ordinary.

The pen section is a shell of synthetic material, machined interiorly so as to receive a feed bar 25 inserted from the barrel end, and a feed bar 35 inserted from the point end. The bar 25 is cylindrical with a conical point, to fit into a corresponding bore made in the shell; and the bar 35 fits into a cylindrical bore made in the point end of the shell at a location such that its exterior orifice 33 will be covered by the tip of the point. The feed bar 25 has a surface channel 26 which is open into the sac, and extends the greater part of the length of the bar forward; and, at a distance around its circumference, this same bar has another surface channel 28 open at the forward end of bar 25, extending the greater part of the length of that bar back toward the sac. Throughout the considerable distance through which these two channels 26, 28 overlap each other there are circumferential capillary grooves, 27 affording communication between the two channels 26, 28, and constituting an interior ink-control reservoir. The bar feed 35 is conveniently made cylindrical with a longitudinal channel 30 to connect with the channel 28, and with deep transverse capillary grooves 31, best seen in Figure 2, which is a section through one of them, to constitute the terminal local reservoir. This feed and reservoir bar 35 stands at a small angle, which as illustrated is about 10°, to the axis of the barrel. The end of this bar is shaped to be flush with the exterior tapering surface of the shell 12, and contains the exterior orifice 33 so located that the tip portion of the point 14 covers the orifice, with the slit 22 and hole 24 connecting with the channel 30. The channels 30, 28, and 26, with the reservoir 27 between the latter, constitute a continuous duct between the sac and the slit.

Ink in the terminal channel 30 and reservoir 31 keeps contact with the slit 22 for feeding the writing extremity 20, so that the pen is always ready to write so long as it contains ink and is held with point down; and the tip portion of the point prevents evaporation by covering the channel and reservoir at all times. But the tip of the point is free to respond resiliently to pressure of the person using the pen.

The body of the point 14 is firmly held by the lugs 16 and pin 18, or by whatever else is chosen for its fastening. The pen point which is illustrated fits into a shallow socket 38 prepared for it on the outside of the tapering part of the pen section, as seen in Figures 1 and 4, there being a narrow marginal groove trench around this socket, and the point having a narrow flange 40 turned down around the edge of its body to fit into this groove which is very deep at the place where the section 3—3 is taken in order to receive the lugs 16.

The flange, lugs and other shape of the point 75

can be made by stamping from sheet metal, and by finishing the tip in the usual way in which points are finished. Although any suitable means may be employed to hold the point on the barrel, with its tip covering the orifice 33, as by top screws through its body into the face of the barrel, it is a feature that the holding can be by means that are invisible, or at least are inconspicuous, and the lugs 16 provide such a fastening. In Figure 7 the lugs 16' are held by a screw 18' at each side of the pen section 12'. Or, as in Figure 8, the lugs may be extended and joined by welding to make a loop, the pen section 12'' being made with a deep cavity to receive this loop at a location where the tapering forward end of the rear feed bar 25'' can penetrate and lock down the loop. Or, in a somewhat similar construction indicated in Figure 9 a bottom screw 18''' can hold down a loop 16''' that is a part of the pen point, encircling a removable part 13''' of the pen section.

Thus constructed, the pen may be equipped with any suitable means (not shown) for filling ink into the barrel, as a lever with bar for compressing the elastic sac 11, or a plunger pump if the ink is held directly in the barrel; and there will be residual air in each reservoir 27, 31 and in the barrel, the volume of this air varying according to conditions of ink content and of temperature. But always when the pen is applied to paper for writing there will be ink at the orifice 33 to supply the slit 22 of the point for instant writing, replacement air entering the hole 24. When writing ceases, outflow of ink will cease because of the capillary holding; there will be no evaporation, because the tip is a lid that bars atmosphere from access; and there will be no flooding, because the reservoirs 27, 31 can be made so large that their residual air is able to make room for whatever ink is driven outward by expansion of air in the barrel.

Thus there is here disclosed a fountain pen that has no opening through which ink can escape except an orifice that is covered by the slitted and flexible tip of a writing point which is held on the pen barrel in readiness for instant writing, with full flexibility of the tip available, and without evaporative loss or dislocation of ink.

It will be understood that the structure and operation thus disclosed are illustrative of principles that can be variously applied within the scope of the claims.

I claim as my invention:

1. A fountain pen comprising a pen point having a writing tip, and a barrel supporting the point and having interior space for holding and supplying ink to the tip, characterized in that the writing end of a barrel is tapered to the extremity of the pen point; and said interior space extends through said taper to the tip of the pen point, and has, within the taper, an auxiliary reservoir comprising capillary spaces extending laterally of the main ink channel; said barrel being a shell wholly enclosing said spaces from atmosphere, except that it has an exterior orifice which is covered and closed by the pen point, said orifice being open only through the slit and hole of the tip.

2. A fountain pen comprising a pen point having a writing tip, and a barrel supporting the point and having interior space for holding and supplying ink to the tip, characterized in that the writing end of the barrel is tapered to the extremity of the pen point; and said interior space extends through said taper to the tip of the pen

point, and has, within the taper, an auxiliary reservoir comprising capillary spaces extending laterally of the main ink channel; said pen point being supported by the barrel at an incline to the axis of the barrel; and said barrel being a shell which wholly encloses said space from atmosphere, except that the shell has an exterior orifice located on the incline of the taper of the barrel whose limits are within an area for which the writing tip of the pen point constitutes a lid.

3. A fountain pen comprising a pen point having a writing tip, and a barrel supporting the point and having interior space for holding and supplying ink to the tip, characterized in that the writing end of the barrel is tapered to the extremity of the pen point, and said interior space extends through said taper to the tip of the pen point, and has, within the taper, an auxiliary reservoir comprising capillary spaces extending laterally of the main ink channel; said barrel being a shell which separates the said ink space from the pen point except at the tip of the point, and which wholly encloses said space from atmosphere except that it has an exterior orifice within the area which the said tip covers.

4. A fountain pen as in claim 1, in which the pen point is mounted on the exterior surface of the barrel.

5. A fountain pen as in claim 1, in which the point end of the barrel is tapered, and the pen point is mounted on the exterior surface of the taper, with its writing extremity at the projected axis of the barrel; and the said ink space is located along the interior surface of the barrel at the side of the taper which is opposite from the side at which the pen point is, and extends thence upward across the axis to the tip of the point; the shell of the barrel on the side of the taper where said ink space is extending under the tip of the pen point up to the axis at the writing extremity.

6. A fountain pen as in claim 1, further characterized in that the barrel has exteriorly a shallow socket conforming to the outline of the body of the pen point, for receiving the pen point; and has means for that body to be secured there.

7. A fountain pen as in claim 1, in which the point end of the barrel is tapered, and the pen point is mounted on the exterior surface of the taper, with its writing extremity at the projected axis of the barrel, there being a shallow socket on the tapering surface, conforming to the outline of the body of the pen point, for receiving the pen point; having depth for making the point body be flush with adjacent surface of the barrel and the barrel having formation for the point's body to be fastened there.

8. A pen point comprising a body and a tapering tip having a slit and hole for writing, the said body having means for mounting the pen point on the barrel of a fountain pen, comprising lugs, depending from the side edges of that body, in form adapted to penetrate a pen barrel and to be engaged within the barrel by a fastening element.

9. A pen point comprising a body and a tapering tip having a slit and hole for writing, the said body having means for mounting the pen point on the barrel of a fountain pen, comprising lugs, depending from the side edges of that body,

in form adapted to penetrate a pen barrel and having holes for being transfixed within the pen barrel.

10. A fountain pen as in claim 1, further characterized in that the barrel has exteriorly a shallow socket conforming to the outline of the body of the pen point, for receiving the pen point; and has means for that body to be secured there; the edges of the body being flanged downward and the socket having a marginal trench into which those flanged edges fit.

11. A fountain pen having a barrel, with pen point mounted on its exterior, said point having mounting means penetrating the barrel; and there being fastening means, penetrating the barrel elsewhere from the exterior and engaging the pen point within the barrel in its mounted position.

12. A fountain pen having a barrel, with separable pen section, and pen point mounted on the exterior surface of that section and having a fastening part depending into that section; there being a hollow within said section to receive said part and there being within that section a bar which is movable endwise to engage and to release said penetrating part.

13. A fountain pen as in claim 12, the penetrating part being a loop, and the movable bar being a feed bar.

14. A fountain pen barrel having means for supporting a pen point, said barrel having interior space for holding ink and supplying ink to the place where the point is when so supported, comprising means for mounting the pen point on the barrel; a feed bar wholly within the barrel, having a duct with an exterior orifice circumscribed within a superficial area of the barrel which is in location suitable to be overlain and superficially surrounded by the writing tip of the pen point for which the barrel provides a support, said support of the pen point being wholly on the barrel, separate from and without contribution of support by the feed bar.

15. A fountain pen barrel as in claim 14, further characterized in that there is a terminal capillary reservoir within the barrel, at said orifice and in position to be enclosed from atmosphere by the pen point when the pen point is so supported.

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