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INK FEED AND OVERFLOW COLLECTOR MEANS FOR FOUNTAIN PENS

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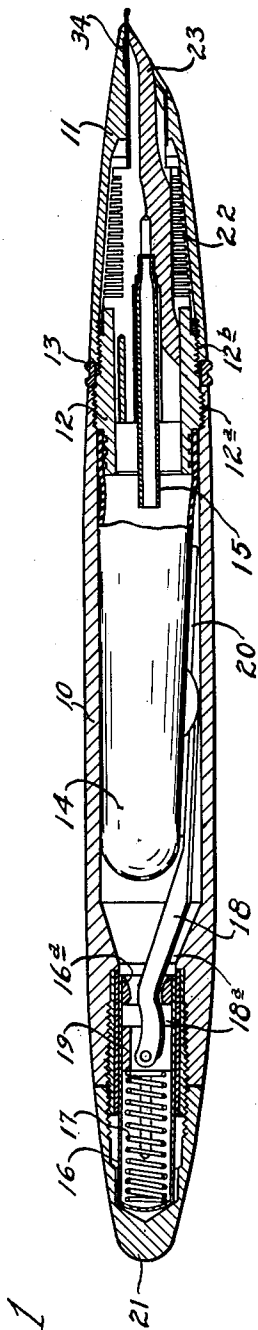


Fig. 1

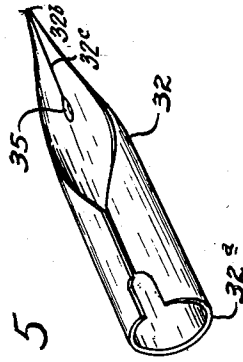


Fig. 5

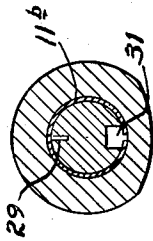


Fig. 4

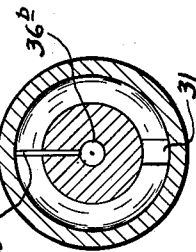


Fig. 3

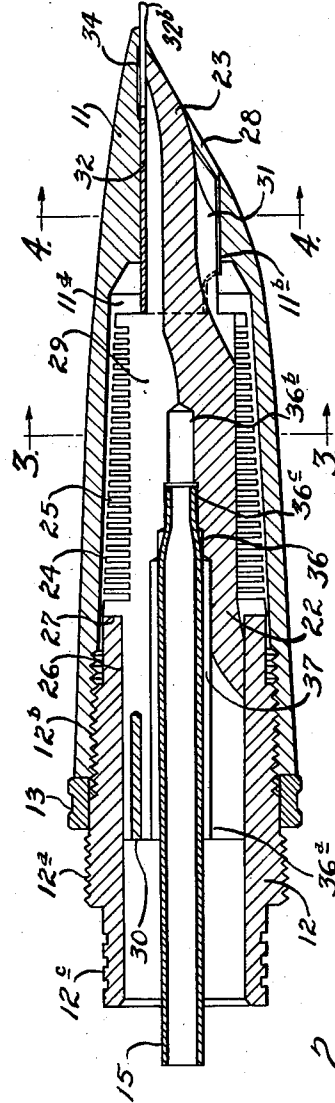


Fig. 2

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2,619,070

INK FEED AND OVERFLOW COLLECTOR
MEANS FOR FOUNTAIN PENSMarlin S. Baker, Janesville, Wis., assignor to The
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3 Claims. (Cl. 120—50)

1

My invention relates to fountain pens, and it has to do particularly with ink feed and overflow collector means therefor.

One of the objects of my invention is to provide improved ink feed and overflow collector means for fountain pens of the type disclosed in my Letters Patent No. 2,223,541 granted on December 3, 1940.

Another object is to provide ink feed and overflow collector means for fountain pens of the foregoing character adapted for use of less expensive nibs, the arrangement being such that less material is required for the nib so that gold nibs may be employed at a much reduced cost.

Still another object is to provide an improved nib and nib mounting for fountain pens of the type having ink feed means and overflow collector means enclosed by a shell except for the writing point of the nib.

An additional object is to provide an arrangement of the foregoing character wherein the nib anchorage is closer to the nib point providing a more positive support for the nib.

A further object is to provide a feed, shell, collector and nib unit wherein the feed unit is retained completely concentric with respect to the shell at all times, and the nib may be mounted in proper predetermined relationship with respect to the feed without cramping and resultant misadjustment thereof.

A further object is to provide a nib mounting wherein lateral vibration of the nib is eliminated and writing under all conditions of use is improved.

Another object is to provide ink feed and collector means for fountain pens of the foregoing character which requires the use of a minimum number of parts of simplified construction, which are easy to assemble and disassemble, which do not get out of adjustment, and which may be manufactured and maintained in service at less cost.

An additional object is to provide integral ink feed and overflow collector means for pens of the foregoing character which permits the use of ink collector cells of greater capacity thereby increasing the overflow capacity of the pen.

A further object is to provide an ink feed, overflow collector unit and nib mounting wherein the flow pattern of ink to the nib point is greatly simplified.

Other objects and advantages will become obvious as this description progresses, and by reference to the drawing wherein:

Figure 1 is a longitudinal sectional view of one form of fountain pen embodying my invention;

Fig. 2 is an enlarged longitudinal sectional view of the front end portion of the pen shown in Fig. 1;

2

Fig. 3 is a section taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a section taken substantially on line 4—4 of Fig. 2; and

Fig. 5 is a perspective view of the writing nib employed.

The pen shown in the drawing includes a barrel 10 with a forwardly extending shell 11 at the forward end. The barrel 10 and shell 11 are detachably secured together by a sleeve-like connector 12 having a threaded portion 12a adapted to be screwed into the forward end of the barrel and a threaded portion 12b adapted to be screwed into the rear end of the shell 11. A clutch ring 13 adapted for attachment of a closure cap (not shown) is mounted on the connector 12 between the barrel 10 and shell 11.

The barrel 10 houses an ink reservoir in the form of a flexible sac 14 carried by an inner reduced end portion 12c of the connector 12. The ink sac reservoir 14 is adapted to be filled with ink by collapsing and expanding it as is customary with ink reservoirs of this type. Any suitable form of filling mechanism may be employed for collapsing the ink sac 14, but I preferably employ the type disclosed in my pending application, Serial No. 627,440, filed November 8, 1945. This is a so-called multiple stroke type of filling mechanism which, as will be well understood by those skilled in the art, includes an air breather tube 15 having one end disposed in the reservoir 14 and the other end connected with the ink feed channel which will be described more in detail hereinafter. Briefly, the filling mechanism comprises a reciprocable end button 16 constantly urged in an outward direction by spring 17. The end button 16, at its forward end, supports an annular cam member 16a which is adapted to engage the cam surface 18a of a lever 18 pivotally connected at its outer end with a barrel-carried part 19 and pivotally supporting a presser bar 20 at its forward end adapted to engage the side wall of the sac 14. As more particularly explained in my said application, Serial No. 627,440, the foregoing arrangement is such that when the end button 16 is depressed, the button-carried cam member 16a rides along the cam surface 18a of the lever 18 and moves the front end of the latter inwardly toward the axis of the barrel 10 to collapse the sac 14. Upon release of the button 16, the spring 17 returns it to its outermost position releasing the presser bar 20 and lever 18 to permit the sac 14 to expand under its own inherent expandibility. The camway 18a is so shaped, as more particularly explained in my said application, Serial No. 627,440, that, when the button 16 fully returns to its outermost position, the lever 18 and presser bar 20 are moved slightly inward to slightly collapse the sac 14; and finally, when the end cap 21 is applied to the rear end of

the barrel, the button 16 is moved inward to an extent wherein the cam member 15a is disposed in deepest portion of the camway 18a whereby the lever 18 and presser bar are permitted to return to their normal fully-expanded positions by the expanding action of the sac 14:

This invention has to do particularly with the feed and overflow ink collector means which is fed with ink from the sac 14. According to my invention, this structure takes the form of a unit having a comparatively large overflow ink collector section 22 and a reduced integral feed bar section 23 of cylindrical cross-sections projecting forwardly therefrom. The collector section 22 has an annular body with a plurality of circumferential fins 24 defining a plurality of circumferential, longitudinally-spaced capillary cells 25. The collector section 22 is further provided with a reduced rearward annular extension 26 which is slip-fitted within and supported by the forward portion of the connector sleeve 12. The reduced connector extension 26 provides a shoulder 27 which is adapted to abut the front end of the connector sleeve 12 thereby positioning the collector section 22 at a predetermined position within the shell 11. When the collector section 22 is so positioned, the feed bar section 23 is positioned with its front end extending to an opening 28 formed in the front end of the shell 11.

For ink feed purposes, the collector section 22 and the feed bar section 23 are provided with a longitudinal, capillary ink feed duct or fissure 29 of approximately five thousandths (.005") inch in width and extending from the rear end of the reduced collector section 26 to a point spaced slightly from the forward end of the feed bar section 23. The feed duct 29 is located in the upper side of the collector and feed bar unit and it intersects the fins 24 and the capillary cells 25 formed thereby. In this way, the capillary cells 25 constituting a capillary overflow space are constantly in connection with the feed channel 29 to receive ink tending to flow through the latter in excess of that required for writing purposes, as more particularly explained in my said Patent No. 2,223,541. The feed duct 29 at the rear end of the collector section is cut entirely across the diameter thereof, and the width of such duct is maintained constant by a pin 30 when the collector section 22 is fitted into the connector sleeve 12.

Air is admitted to the ink reservoir 14 by way of the ink collector cells 25, as explained in my said Patent No. 2,223,541, and to that end the underside of the feed bar section 23 is provided with a rectangularly-shaped air channel 31 which extends rearwardly through the collector section 22 intersecting all of the fins 24 and capillary cells 25 at a point diametrically opposite the feed duct 29.

In writing, ink is delivered to the writing surface by way of a shell-mounted nib 32. The nib 32 is provided with a cylindrical shank portion 32a and a writing end portion 32b slitted longitudinally at 32c. The shell 11 is provided with an enlarged chamber 11a adapted to receive the collector section 22 with its chamber wall slightly spaced from the periphery of such collector section, and it is further provided with a reduced substantially cylindrical bore 11b connecting the chamber 11a with the shell opening 28. The nib shank 32a is of a diameter adapted to fit snugly within the cylindrical shell bore 11b, the underside of such nib shank being

notched at its rear end so as not to obstruct the air passage 31. The nib 32 is of such length that its shank 32a projects rearwardly beyond the forward shell bore 11b into abutting relation with the forward end of the collector section 22 and, when so engaged, its writing point 32b projects through the shell opening 28 slightly beyond the forward end of the shell 11 with the nib slit 32c directly above and connected to the forward end of the feed duct 29. The cylindrical shell bore 11b above and in alignment with the slitted writing end portion 32b of the nib is slightly recessed to provide, with the adjacent surface of the nib, a fine capillary space 34 corresponding substantially to the space 56 above the nib of the pen disclosed in my Patent No. 2,223,541. This space 34 is connected with the capillary feed duct 29 by way of the nib slit 32c and also by way of a pierce 35 in the upper wall of the nib shank rearwardly of the inner end of the slitted portion of the nib.

The collector section 22 is provided with an axial bore 36 extending from the extreme rear end thereof to a point near the foremost capillary cells 25. The bore 36 is formed with multiple diameters, the rearmost diameter 36a being largest and the foremost diameter 36b being the smallest. The mid-diameter portion 36c of the bore 36 is adapted to receive and support the front end of the breather tube 15 thereby connecting the interior of the ink reservoir 14 with the forward bore portion 36b and the feed duct 29. The feed duct 29 intersects the bore portion 36c and, in this way, the ink reservoir 14 is connected by way of the breather tube 15 with the ink feed duct 29 intermediate the ends of the latter for multiple-stroke filling purposes, such, for example, as explained in my said Patent No. 2,223,541 and the Dahlberg Patent No. 1,904,358, issued April 18, 1933.

The breather tube 15, with the greater diameter portion 36a of the bore 36, forms an annular capillary space 37 of larger dimension than the feed duct 29, and this space 37 serves the purpose of a primary ink passage corresponding to the primary ink passage 39 of my said Patent No. 2,223,541. The rear portion of the feed duct 29, from its rear end to a point slightly forward of the rearmost capillary cells 25, is connected with the primary ink feed passage 37 for air and ink feed control purposes as will be understood from my said patent.

It is believed that the operation of my invention will readily be understood from the foregoing description. Briefly, ink flows from the reservoir to the slit 32c in the writing end 32b of the nib 32 by way of the feed ducts 37 and 29. Air is fed to the reservoir for release of ink therefrom by way of the air passage 31, the rearmost capillary cells 25 and the feed ducts 29 and 37. Ink is also deposited in the capillary space 34 above the nib by way of the nib slit 32c and pierce 35. As explained in my said Patent No. 2,223,541, when an unbalanced pressure condition exists in the reservoir 14 of a character causing more ink to be fed than is required for writing purposes, the excess ink flows into the capillary cells 25 preventing flooding of ink at the writing point of the pen. When this occurs and the capillary cells 25 are filled with ink, the flow of air to the reservoir 14 is blocked and no more ink is fed from the reservoir until the cells are emptied. The cells may be emptied either by writing out the ink therefrom or by the restoration of a normal pressure condition within the reservoir 14, thereby

causing the ink from the cells 25 to be drawn back thereinto.

A pen embodying my invention presents many advantages. The use of a separate feed bar is eliminated. The feed means from the reservoir 14 to the nib 32 is an integral unit. The integral collector and feed bar sections permit the use of a continuous, longitudinal ink feed duct which provides a very simple ink flow pattern from the reservoir 14 to the writing point of the nib. This arrangement reduces the number of parts required. It also eliminates the necessity of adjustment and precision fitting of separately constructed parts. The integral arrangement greatly facilitates manufacture of the feed and collector structure as well as maintenance, and it insures long periods of operation without the necessity of repair or adjustment. It eliminates the necessity of making provision for support of the nib by the collector section in relation to the feed bar section; and, in so doing, it enables the use of a deeper feed duct and, in turn, deeper capillary cells, providing greater overflow capacity for the collector. It eliminates the necessity of precision mounting of the nib with respect to both the collector section and the shell. By supporting the nib in the shell, it may more readily be adjusted in relation to the feed. The amount of material required for the nib is reduced thereby effecting a considerable saving in material, particularly where gold nibs are employed. The nib may be firmly and accurately positioned by the shell in such a way as to avoid lateral vibration in the use of the pen, thereby insuring a uniform writing line, smoother writing action and improved ink feed. The nib may initially be adjusted for the proper feed condition in relation to the feed means and such relation will be maintained.

I claim:

1. In a fountain pen having a barrel with an ink reservoir therein, an integral ink feed and over-flow ink collector unit comprising a collector section adapted to be connected at its rear end to the barrel in communication with the ink reservoir and having a series of circumferential fins on its periphery defining capillary ink storage cells and a central axial bore terminating short of the forward end thereof, a reduced feed bar section extending forwardly from the front end of said collector section, said unit having a capillary ink feed slit of uniform width extending continuously throughout the entire length of said collector section and along said reduced feed bar section substantially to the forward end thereof, said slit intersecting said cells and extending into said central bore in communication therewith throughout the length of the bore and an air channel extending from the forward end of said feed bar section through said collector section to near the rear end thereof and intersecting all of said fins, and an air breather tube having one end mounted directly in an opening directly into said central bore intermediate the ends thereof and forming with the rear portion of the bore an annular ink feed passage communicating with said slit throughout the major portion of the latter and opening at the rear end of the unit into said reservoir.

2. In a fountain pen having a barrel with an ink reservoir therein, an integral ink feed and overflow ink collector unit comprising a collector section adapted to be connected at its rear end to the barrel in communication with the ink reser-

voir and having a series of circumferential fins on its periphery defining capillary ink storage cells and a central axial bore terminating short of the forward end thereof, a reduced feed bar section extending forwardly from the front end of said collector section, said unit having a capillary ink feed slit of uniform width extending continuously throughout the entire length of said collector section and along said reduced feed bar section substantially to the forward end thereof, said slit intersecting said cells and extending into said central bore in communication therewith throughout the length of the bore, the depth of said slit opposite rearmost of said cells being less than the depth opposite the remainder of the cells, and an air channel extending from the forward end of said feed bar section through said collector section to near the rear end thereof and intersecting all of said fins, and an air breather tube having one end mounted directly in and opening directly into said central bore intermediate the ends thereof and forming with the rear portion of the bore an annular ink feed passage communicating with said slit throughout the major portion of the latter and opening at the rear end of the unit into said reservoir.

3. In a fountain pen having a barrel with an ink reservoir therein, a multiple stroke filling mechanism for alternately expanding and contracting said reservoir, an integral ink feed and over-flow ink collector unit comprising a collector section adapted to be connected at its rear end to the barrel in communication with the ink reservoir and having a series of circumferential fins on its periphery defining capillary ink storage cells and a central axial bore terminating short of the forward end thereof, a reduced feed bar section extending forwardly from the front end of said collector section, said unit having a capillary ink feed slit of uniform width extending continuously throughout the entire length of said collector section and along said reduced feed bar section substantially to the forward end thereof, said slit intersecting said cells and extending into said central bore in communication therewith throughout the length of the bore and an air channel extending from the forward end of said feed bar section through said collector section to near the rear end thereof and intersecting all of said fins, an air breather tube having one end mounted directly in and opening directly into said central bore intermediate the ends thereof and forming with the rear portion of the bore an annular ink feed passage communicating with said slit throughout the major portion of the latter and opening at the rear end of the unit into said reservoir.

MARLIN S. BAKER.

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