Sept. 5, 1950 V. H. SEVERY 2,521,657

FOUNTAIN PEN

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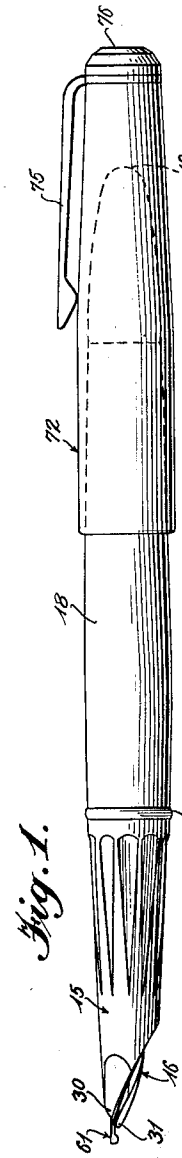

Fig. 1.

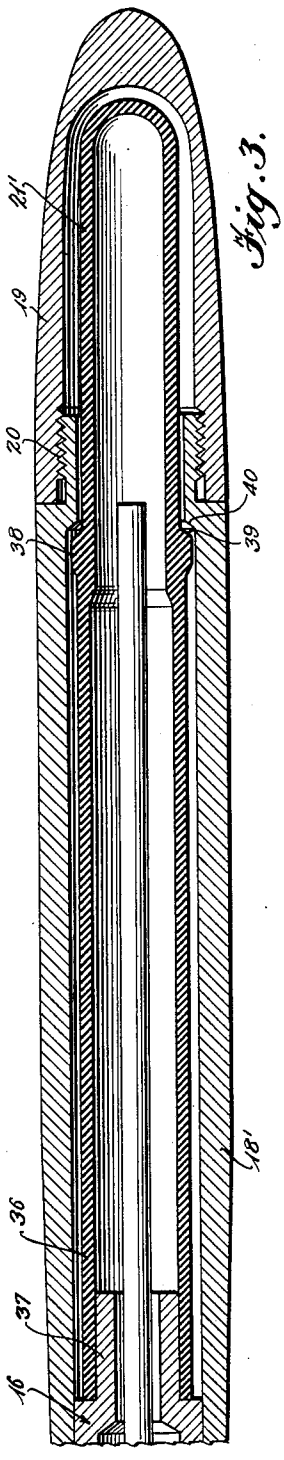

Fig. 3.

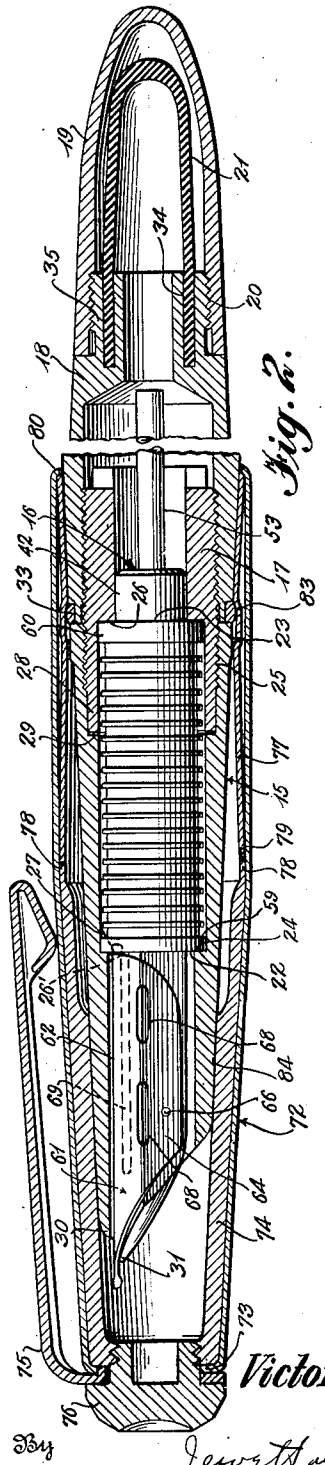

Fig. 2.

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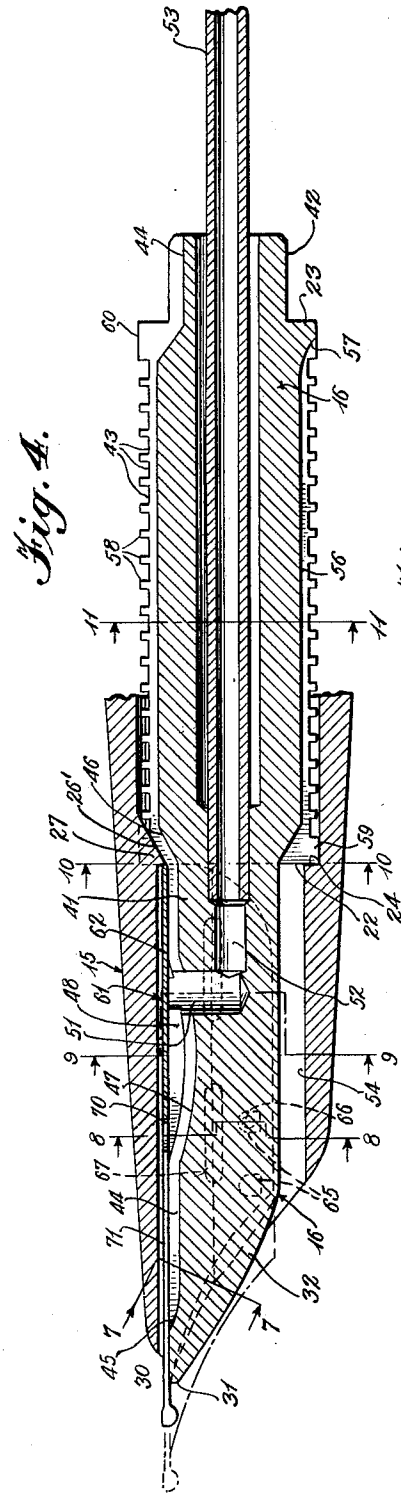

Fig. 4.

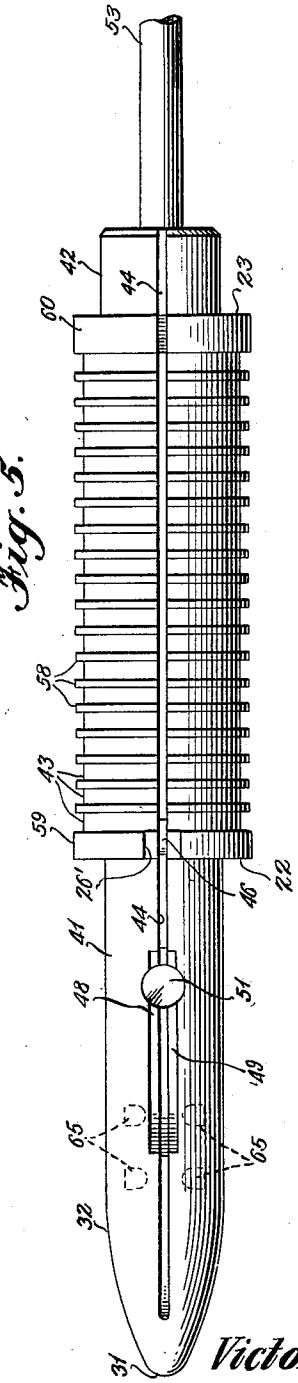

Fig. 5.

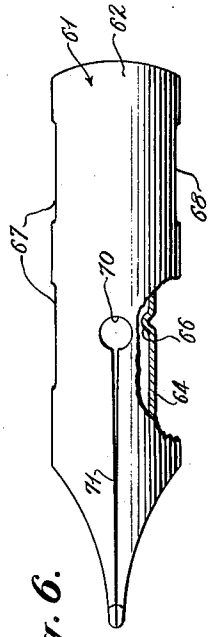

Fig. 6.

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Fig. 7.

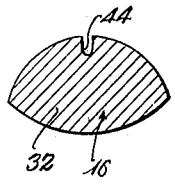


Fig. 8.

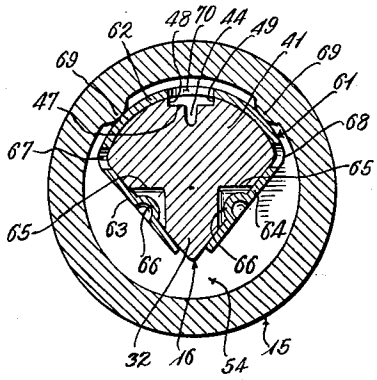


Fig. 9.

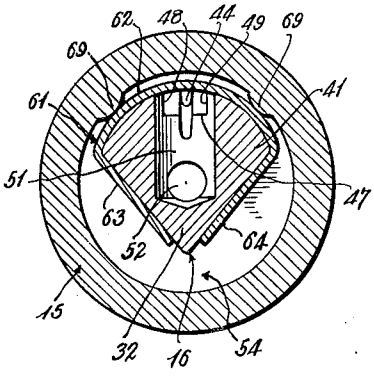


Fig. 10.

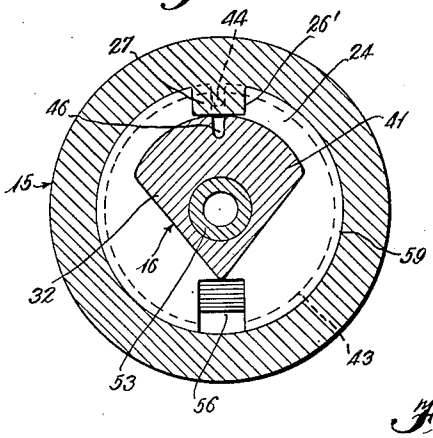


Fig. 11.

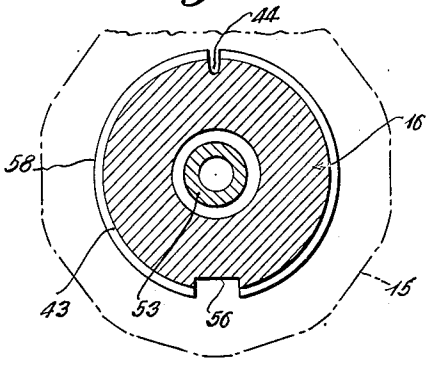
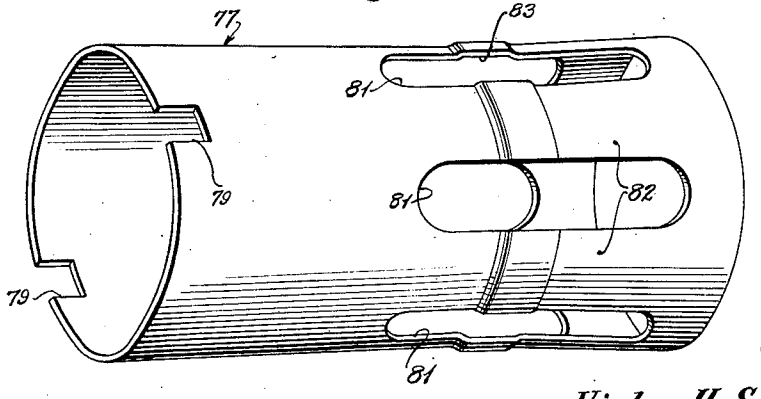


Fig. 12.



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UNITED STATES PATENT OFFICE

2,521,657

FOUNTAIN PEN

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Application July 7, 1944, Serial No. 543,785

5 Claims. (Cl. 120—50)

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The invention relates to fountain pens and has as an object the provision of a pen having the parts designed to be molded from a synthetic plastic.

It is a further object of the invention to provide a pen having a nib that may be adjusted relative to the feed bar and barrel whereby to modify its effective resiliency.

Further objects of the invention are to improve the feed of the ink to the nib by independently venting air to the ink reservoir; to provide capillary ink storage spaces at the surface of the feed bar that may be molded but yet retain their capillary character; to improve the ink and air flow during the filling operation; to provide a filling structure that permits of large ink capacity in the barrel; and to improve the cap retention on the barrel.

Further objects will appear from the following description when read in connection with the accompanying drawings showing illustrative embodiments of the invention and wherein:

Figure 1 is a side elevation of the pen with the cap in writing position.

Figure 2 is a central longitudinal section to a much enlarged scale broken away to reduce its length.

Figure 3 is a detail central vertical section upon a still larger scale showing a different form of ink container.

Figure 4 is a detail longitudinal section showing the feed bar with a portion of the hood member of the pen.

Figure 5 is a plan view of the feed bar.

Figure 6 is a plan view partly broken away of a form of nib.

Figures 7, 8, 9, 10 and 11 are transverse sections upon a still further enlarged scale taken on the corresponding section lines of Figure 4, and

Figure 12 is a perspective view of a spring member to form a portion of the cap of the pen.

As shown, the pen comprises a hood member 15 having a feed bar 16 fixedly mounted therein retained by a union 17, and a reservoir member 18, terminating in a tip 19 retained and removable at the screw threaded joint 20 for access to the pen filling device 21 or 21'.

The feed bar is shown as formed with oppositely facing shoulders 22, 23. The shoulder 22, when the pen is assembled is pressed against an internal shoulder 24 by pressure developed by the screw threaded connection 25 between the union and the hood causing internal shoulder 26 of the union to press against the shoulder 23 of the feed bar.

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To index the feed bar in the hood the shoulder 22 is shown as formed with a notch 26' and the shoulder 24 with a complemental lug 27 residing in the notch when the pen is assembled.

The length of the skirt 28 of the union 17 is such that it will not seat against the internal shoulder 29 before full pressure is developed between shoulders 23, 26. It follows that the point 30 of the nib will be accurately indexed with the point 31 of the nib carrying portion 32 of the feed bar and with the nib itself for reasons described below. Because the hood cannot be revolved on the feed bar, and because the union is forcibly screwed into the hood developing holding friction on the threads between the union and hood plus friction at the shoulders 23, 26, any attempt to unscrew the threads 25, after the pen is assembled, by causing relative rotation between the hood and the reservoir 18, will cause removal of the reservoir, leaving the assembly of the hood, feed bar, and union unaffected.

Advantages of this structure are: that once the pen is assembled the relation of the feed bar to the hood is fixed; the size of certain capillarly passages, to be described, is fixed; the nib which is carried by the feed bar has a firm support within the surrounding structure; and assembly is facilitated.

The reservoir member 18 has screw threaded engagement with the union 17, a ring 33 being interposed in the joint, the ring having an outwardly convex surface to coact with the cap.

In the form of Figure 2, the reservoir 18 directly receives the ink and for filling purposes a bulb 21 is shown as seated in an annular recess 34 formed in the extension 35 of the reservoir which extension provides with the screw threads 20 for retention of the cap 19.

In the form of Figure 3 a rubber sack 36 is shown as engaged upon an extension 37 of the feed bar which sack is integral with the filling bulb 21' extending into the tip 19 to be exposed for manipulation when the tip is removed for the purpose. As shown, the sack 36 is formed with an enlarged portion 38 providing a shoulder 39 to overlie an internal shoulder 40 formed in the reservoir portion 18'. By provision of these coacting shoulders 39, 40, it is impossible for misuse of the bulb 21' to result in displacing the sack 36.

The feed bar as shown comprises a nib receiving portion 41, an extension 42 to fit within the union 17, and a centrally enlarged portion formed with a plurality of grooves 43 to serve as ink storage means from which ink may be given down

when excess demand of writing conditions requires.

As shown, the upper portion of the bar is formed with an ink channel 44 cutting across the grooves 43 and extending from communication with the interior of the reservoir to a point as 45 closely adjacent the point of the nib. At 46 the channel 44 dips to pass below the indexing lug 27 which resides in the notch 26 as already described. The channel 44 is shown as curved downwardly at 47 and widened at its sides as shown at 48, 49 to permit air entering at the sides of and over the nib to pass to the well 51 in communication with the bore 52 of the feed bar. The said bore is shown as enlarged to receive the end of a vent bar 53 which extends to the upper portion of the ink reservoir.

Ample air admission space is shown at 54 below the end of the said bar. During the filling operation ink may be supplied to the grooves 43 through a lower channel 56 which cuts across the grooves 43 at the lower side of the feed bar and which terminates at 57, as well as over the nib, through opening 70 of the nib and into channel 44.

An important feature of the invention is the proviison of a pen all parts of which may be molded from a synthetic resin.

The grooves 43 in order to be operative must be of capillary size. Capillarity is secured in a form of feed bar which may be molded in accordance with the invention, by making the grooves 43 wide enough to be molded but shallow enough to have capillary action when in coaction with the surrounding hood structure. To this end the interior of the hood is shown as being of a diameter to provide a slight spacing from the edges of the ribs 58 between the grooves 43 whereas the flanges 59, 60 of the feed bar are of slightly greater diameter than the ribs 58 so as to fit closely within the hood at one end and within the union at the other end of the feed bar.

The internal diameter of the union 17 where it overlies some of the ribs 58 is the same as the internal diameter of the hood member itself.

An important feature of the invention is a nib which may be adjusted for different writing qualities. To this end the portion 41 of the feed bar is shown as substantially triangular in cross section with one side of the triangle formed upon a convex surface. The nib 16 shown in plan view in Figure 6 has a convex portion 62 to seat upon the convex surface of the feed bar and wings 63, 64, each extending at an angle to the portion 62 to overlap the remaining two sides of the triangular portion of the feed bar. The feed bar is shown as formed with depressions 65 and the nib with a pair of beads 66 to enter the depressions 65. Two pairs of depressions 65 are shown, one to receive the beads 66 when the nib is in its most retracted position and one when the nib is pulled out to the dotted line position of Figure 4. It is obvious that other positions of adjustment might be provided.

To provide desirable resiliency of the wings 63, 64 in their relation with the main portion of the nib portions at the angle of junction therebetween, the angles are cut away at 67, 68. To assist the wings 63, 64 in supporting the nib against the pressure of the nib upon a writing surface and to provide a capillary ink passage above the nib a plurality of ribs 69 are provided preferably formed on the inner surface of the hood, as seen in Figures 8 and 9. In the form shown, two of these ribs are provided.

The nib is shown as formed with the usual perforation 70 and the slit 71 leading to the point of the nib is slightly widened adjacent the perforation 70.

The cap shown for purpose of illustration comprises a metallic shell 72 turned into a flange 73 about the open end of an internal shell 74 as of plastic material with a clasp 75 interposed between the flange 73 and the head of a screw threaded plug engaging internal screw threads in the end of the shell. A down turned lug struck from the eye of the clasp enters a recess in the flange of the shell, as shown in Figure 2, to prevent relative movement. To retain the cap upon the pen when the pen is not in use, an internal sleeve member 77 is seated in the shell 72 and revolution of the sleeve with respect to the cap is prevented by means of portions 78 seating in recesses 79, in the sleeve. The material 74 is fixed immovably in the shell as by cementing the same therein and the sleeve 77 is retained in the shell by the down turned margin 80 thereof.

As shown the sleeve 77 is cut away at portions 81 to provide a resiliency of the remaining portions 82 which portions are inwardly deflected and formed with an annular recess 83 to snap over the ring 33 in the pen body. The interior of the plastic portion 74 of the pen is dimensioned to have a sealing seat at 84 closely adjacent the front end of the hood member of the pen and the angle between the coacting surfaces is such as to not slip when fixed home.

To remove the cap from the pen a turning motion is utilized to break the seal, combined with a longitudinal pull to remove the spring members 32 from the rib 33.

In operation the flow of ink from the reservoir toward the nib through the passage 44 is independent of the access of air to the reservoir through the bore 52 and the vent tube 53. At times when the flow in passage 44 is in excess of writing requirements the excess ink will be received by the grooves 43 with escape of air from the grooves by way of passage 56. When writing demands are excessive the reserve supply from the grooves 43 will supplement that flowing from the reservoir and air in channel 56 will lessen the surface tension of the groove-held supply to release it. The space between the ridges 58 and the inner surface of the hood will assist in the flow of ink from the grooves to the nib.

When the ink flowing to the nib reaches the spaces 48, 49 it will fall into and fill the cross bore 51 and overflow therefrom to the nib. Vent air entering through the channel 44 will bubble through the ink in the cross bore, into the vent 52 thereby valving the supply of ink from the reservoir. The channel 44 being of capillary size, and the bore 52 and pipe 53 being much larger, insures that the air flow and the ink flow will be as described.

The ink in the grooves 43 held by capillary action must rise at the sides of the bar to reach the channel 44. Therefore while the supply of ink from the reservoir aided by the force of gravitation, is ample, ink will not be drawn from grooves 43.

The nib when in the full line position of Figure 4 will have little resiliency and will produce a line of minimum width. When extended to the dotted line position, the nib will flex more with spreading of the point using more ink. In this position of the nib its rear end will be spaced from the shoulder 22 of the feed bar permitting ink from passage 44 to gain access to the upper

surface of the nib to flow in the space provided by ribs 69, giving an augmented supply of ink for the heavier line then produced.

Minor changes may be made in the physical embodiments of the invention within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A writing tip assembly for pens comprising, in combination: a hood member tapering to a writing tip and formed with a nib surrounding bore adjacent said tip, a feed bar housing bore of increased diameter forming an internal shoulder, and a bore portion of further increased diameter screw threaded at its opening; an externally screw threaded union member formed with a feed-bar-end receiving bore, a second bore portion of substantially the same diameter as that of the intermediate bore of the hood, forming an internal shoulder with the first named bore; and a feed bar having one end mounted in said union member and its remaining end mounted in and in contact with said hood member at said internal shoulder thereof; said feed bar formed with a plurality of circumferential recesses, the crests of ribs separating said recesses being spaced from the inner surfaces of the intermediate bore of the hood and of the like bore of said union by a capillary space; the internal shoulder in the hood and the coacting end of the feed bar formed with coacting lug and recess rotation-preventing means; whereby pressure exerted by said union upon the feed bar and friction of said screw threads holds the parts in assembly when a connected reservoir barrel is removed.

2. A fountain pen comprising, in combination: a hollow internally cylindrical hood member of reduced diameter adjacent a nib enclosing end portion providing a rearwardly facing internal shoulder; a feed bar mounted in said hood member formed with portions of differing diameters residing in the corresponding cylindrical portions of the hood member, with a forwardly facing shoulder seating upon the shoulder of the hood member and with the smaller portion of the feed bar of substantially triangular cross-section with the base facing upwardly and with at least the base outwardly convex; a correspondingly formed nib seated on the smaller portion of the feed bar; capillary ink-storage recesses formed in the surface of the larger portion of the feed bar; said feed bar formed with channel means to conduct ink to the nib; and means to hold said shoulders in contact.

3. A fountain pen comprising, in combination: a hood member having a hollow writing end portion; a feed bar mounted in said hood member, formed with a nib carrying portion of substantially triangular cross-section with a convex upwardly facing base and freely projecting into said hollow portion; a nib formed with a central portion conforming to said convex portion and with a pair of wings resiliently engaging the remaining sides of the feed bar; said nib slidably carried by said feed bar for adjustment thereon; and means to hold said nib in adjusted position.

4. The structure of claim 3 in which the means holding the nib in adjusted position each comprise an eminence carried by one of the contacting surfaces engaging in a depression carried by the remaining surface.

5. The structure of claim 3 wherein one of the opposed surfaces of the nib and hood is formed with at least one longitudinal rib to maintain a space between the nib and the interior of the hood.

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