

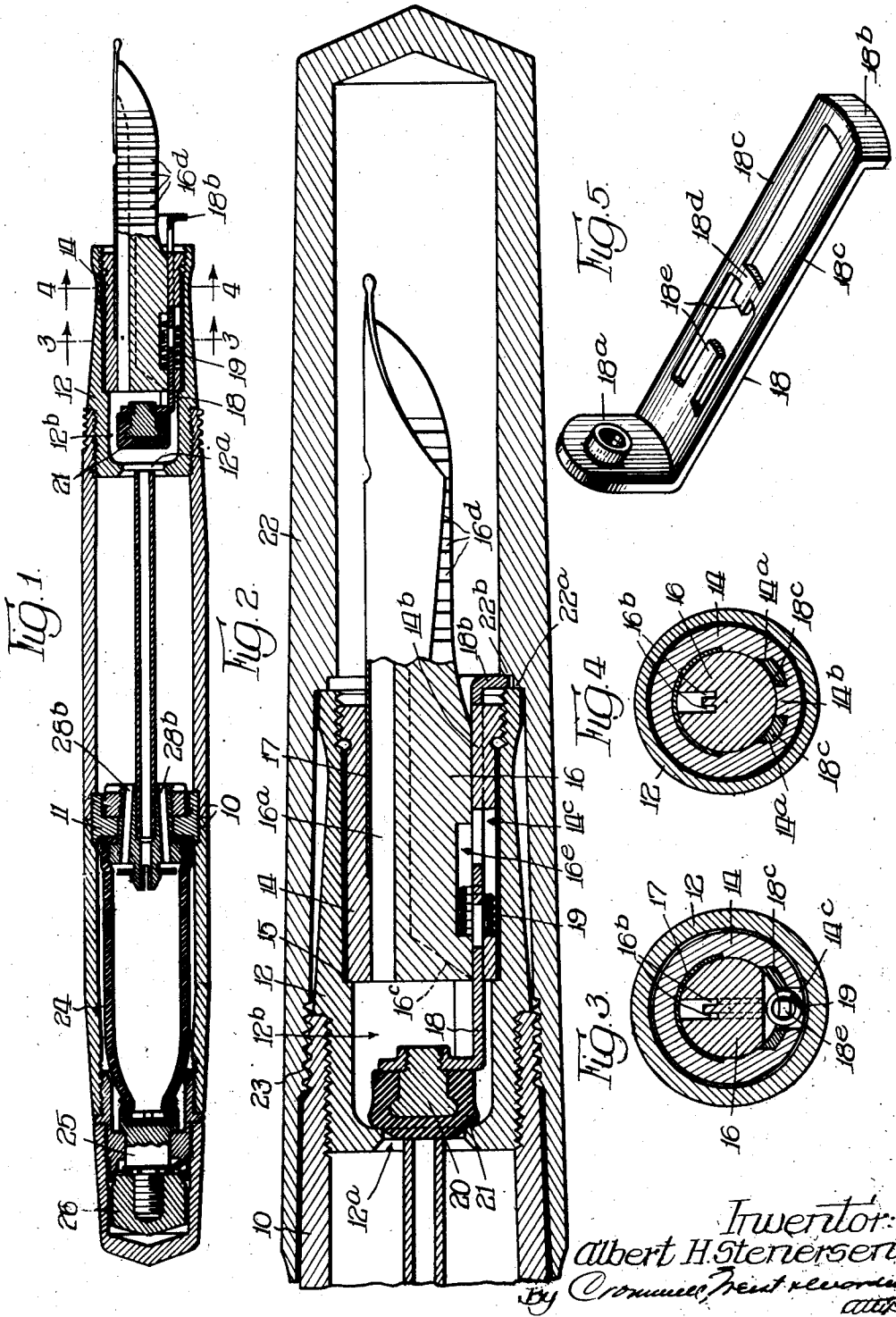
Jan. 3, 1939.

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2,142,533

FOUNTAIN PEN

Original Filed Oct. 20, 1934 2 Sheets-Sheet 1



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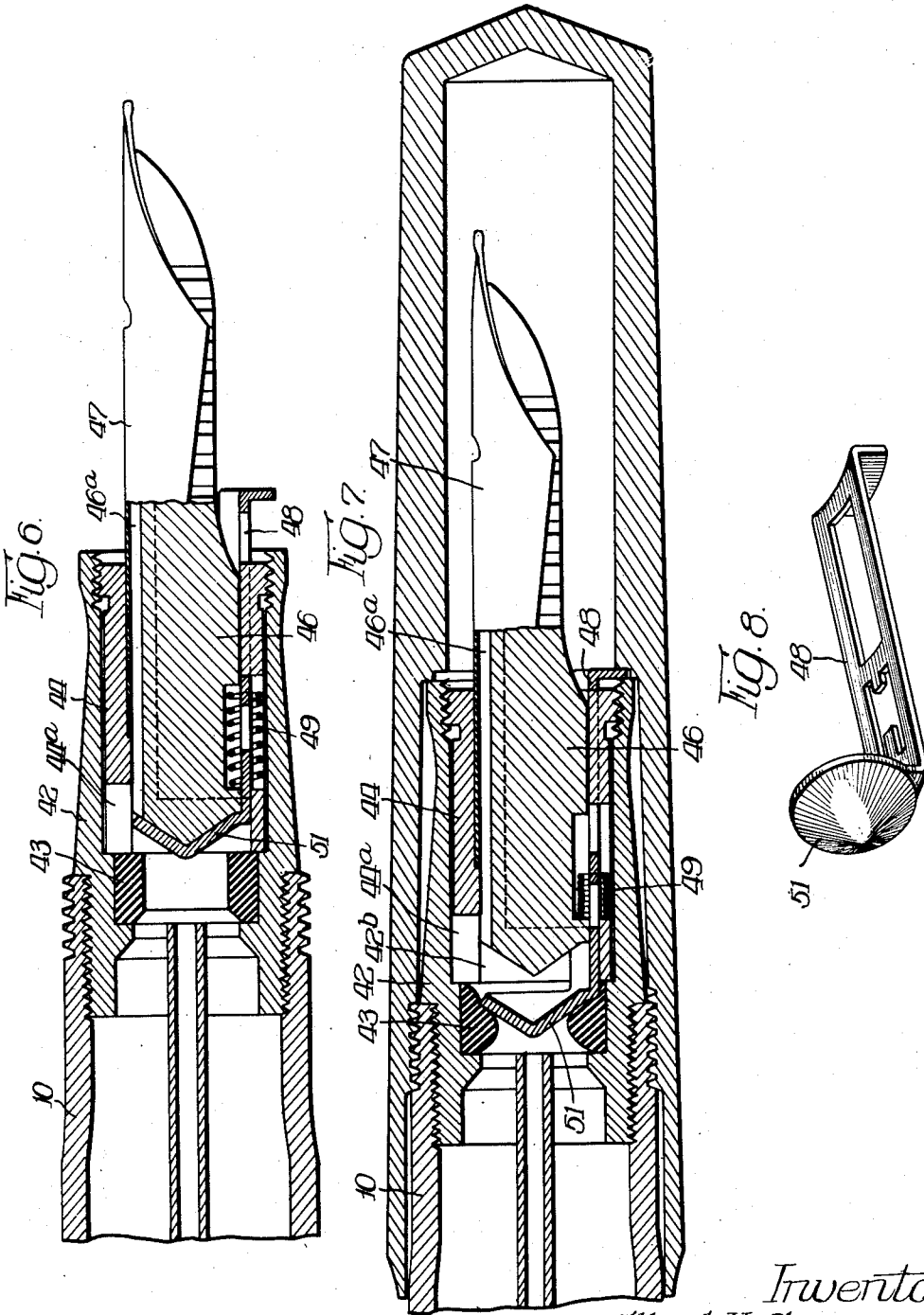
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UNITED STATES PATENT OFFICE

2,142,533

FOUNTAIN PEN

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Application October 20, 1934, Serial No. 749,152
Renewed May 27, 1938

14 Claims. (Cl. 120—48)

This invention relates to fountain pens and is concerned primarily with an improved construction for preventing leakage of ink from the reservoir when the pen is capped, as when carried in the pocket.

One object of the present invention is the provision of a fountain pen in which the ink reservoir is definitely closed or sealed off from the ink passages by which ink flows to the pen point, when the cap is seated on the lower end of the pen in housing relationship to the pen point.

Another object is the provision of such a construction in which, when the ink reservoir is so sealed, the ink-feeding passages of the feed bar, and the ink-receiving portions of the pen point, will be maintained in a proper moist condition to obtain immediate and proper feed of ink to the pen point for writing, after removal of the cap.

Another object is the provision of such a construction which will be positive and certain in operation, both in the sealing and unsealing of the ink reservoir, and which will afford a proper flow of ink from the reservoir to the pen point in writing and from the feed bar to the reservoir in the filling of the latter.

Yet another object is the provision of such a construction which is comparatively simple, which may be manufactured economically and which admits of disassembly with facility for the purpose of inspection, cleaning or repair.

Further objects of the invention include the provision of improved features and mechanism of fountain pen construction.

Still other objects and advantages of the invention will be pointed out or indicated hereinafter or will be apparent to one skilled in the art upon an understanding of the invention or its employment in use.

For the purpose of aiding in the explanation of the invention, I show in the drawings forming a part of this specification, and hereinafter describe, certain structures representing embodiments of the same, but it is to be understood that these are presented by way of illustration only, both as to general construction and detailed features, and hence are not to be interpreted in any fashion calculated to limit the appended claims short of the true and most comprehensive scope of the invention in the art.

In said drawings,

Fig. 1 represents a longitudinal sectional elevation of a pen structure embodying the invention;

Fig. 2 is a part longitudinal sectional elevation of the same structure but showing the pen cap in place and certain parts in side elevation;

Fig. 3 is a cross section substantially on line 3—3 of Fig. 1, but on the larger scale of Fig. 2;

Fig. 4 is a cross section substantially on line 4—4 of Fig. 1, but on the larger scale;

Fig. 5 is a perspective view of the valve slide constituting part of the structure illustrated in the foregoing figures;

Fig. 6 is a part longitudinal sectional elevation of a pen structure representing another embodiment of the invention;

Fig. 7 is a similar longitudinal sectional elevation of the same structure but showing the pen cap in place and certain of the parts in an altered relationship; and

Fig. 8 is a perspective view of a valve slide constituting part of the structure illustrated in Figs. 6 and 7.

Described generally, the invention contemplates a structure in which the pen barrel affords an ink reservoir, which preferably is entirely closed excepting for a passage leading to the pen section, together with a valve operably mounted on the pen section and adapted to close said passage to cut off communication between the reservoir and the passages which supply ink to the pen point. This valve is adapted to be seated in the operation of seating the pen cap in housing relationship to the pen point, and is arranged to unseat automatically upon removal of the pen cap preliminary to use of the pen for writing. The barrel contains means operable to effect the filling of the reservoir by induction of ink through the ink feed passages, and this filling means is sealed off from the pen point by the closing of the valve. The construction provides also a suitable ink-containing space between the valve in its seated position and the pen point, for accommodation of a limited quantity of ink such as to maintain the ink-feeding passages of the feed bar and the ink-receiving surfaces of the pen point properly moist when housed in the cap, so that upon removal of the latter, incident to which the valve is unseated, a proper flow of ink to the pen point will ensue immediately, for writing.

A further and more detailed understanding of the invention may be had from a consideration of the illustrative embodiments shown in the drawings, which will now be described.

The pen comprises a tubular barrel, which may be made of two sections 10, abutted end to end and connected by an internally disposed collar 11, to which they may be joined by cementing. Mounted on the lower end of the barrel is a sleeve 12, preferably screw-threaded in place in such fashion as to have leak-proof connection with

the barrel. The upper end of this sleeve carries a partition which closes the lower end of the barrel excepting for an aperture 12^a, below which the sleeve affords a chamber 12^b. In sleeve 12 is demountably seated a bushing 14 which makes a leak-proof joint with an internal shoulder of the sleeve at 15. In the bushing 14 are mounted the feed bar 16 and the pen point 17.

Considering first the embodiment illustrated in Figs. 1 to 5 inclusive, the feed bar is formed with the longitudinal ink feed channel 16^a, which is of liberal proportions and which is extended into the feed bar by narrow kerfs or crevices 16^b which, at the upper end of the feed bar, extend across the width of the same in a diagonal direction as indicated at 16^c. The lower portion of the feed bar is provided with the lateral comb slots 16^d. Near the upper end of the feed bar, it is grooved transversely in its under side, as shown at 16^e.

The bushing 14 is provided internally with longitudinal grooves 14^a, leaving a longitudinal spline 14^b between them, and it is also slotted at 14^c. A valve slide 18 of corrosion-resistant metal is provided, the same having a longitudinal arm, which is curved transversely to conform to the curvature of the bushing 14, which arm carries at its upper end an inwardly deflected valve-supporting portion 18^a and at its lower end an outwardly deflected portion 18^b. The slide is slotted longitudinally to provide parallel portions 18^c which fit slidably in the grooves 14^a of the bushing, the slot between said parallel portions terminating at a stop portion 18^d. Above said slot, the slide is slotted to provide longitudinally aligned guide portions 18^e separated by an intervening space.

The slide is assembled in the bushing 14 before insertion of the feed bar and pen point therein, its inwardly presented surface being flush with the bore wall of the bushing. After insertion of the pen point and feed bar, the coiled spring 19 is inserted through the slot 14^c and between the guide members 18^e, being longitudinally compressed in so doing, so that when it resumes its normal extended form it encircles the guides 18^e and its upper end abuts the upper end wall of the grooves 14^c and/or 16^e and its lower end abuts the stop member 18^d. The action of the spring, consequently, is normally to hold the slide in its lowermost position, illustrated in Fig. 1, wherein the stop member 18^d abuts the upper end of the spline 14^b.

In the extension 18^a is mounted a button 20 over which is fitted a cap-like valve 21, which is made of a suitable soft, elastic material, such as rubber. In the assembled structure this valve is housed in the chamber 12^b and is adapted to seat against the upper wall of the sleeve 12 to close the aperture 12^a. The valve is moved to seated position by pushing the slide 18 upwardly against the pressure of spring 19, the slide having a movement of sufficient length to permit the elastic valve being firmly compressed on its seat so as to seal the outlet of the ink reservoir.

The pen is provided with a cap 22 suitably formed to house the pen point and feed bar when it is attached to the lower end of the pen, as by means of the screw threads 23. The cap is provided with an internal annular shoulder 22^a adapted to seat on the lower end of the sleeve 12 so as to close tightly the cavity of the cap in which the pen point and feed bar are housed. Below the shoulder 22^a, the barrel portion of the cap is provided with an inwardly offset valve-

operating shoulder 22^b which is adapted to contact the outwardly deflected portion 18^b of the valve slide. Consequently, in the operation of seating the cap on the lower end of the pen, the slide will be propelled upwardly and the valve moved to seated position through cooperation of shoulder 22^b with slide portion 18^b, and the valve will be secured in seated position by virtue of the thread engagement of the cap with the pen at 23. The relationship of the parts with the valve in seated position is illustrated in Fig. 2.

The pen may be equipped with a self-contained filling device such as illustrated in Fig. 1. This comprises a compressible elastic bulb 24, the upper end of which is closed and connected to a spindle 25 which carries an operating button 26 at its upper end.

The interior cavity of the bulb 24 and the cavity of the barrel below the collar 11 constitute the ink reservoir. This reservoir may be filled, when the valve 21 is in its unseated position, by submerging the projecting pen point and feed bar in a body of liquid ink, rotating the button 26 to collapse and twist the elastic bulb, then releasing the button 26 to permit the bulb to resume its normal distended form under its inherent elasticity. It may be necessary to repeat this operation several times in order to completely fill the ink reservoir.

In use of the pen for writing, ink flows from the bulb cavity by way of the axial bore and the lateral bores 28^b and from the barrel cavity by way of the aperture 12^a, and thence through the chamber 12^b to the ink feed channel 16^a and crevices 16^b and 16^c to the pen point.

When the valve 21 is seated, the entire ink reservoir is effectively sealed off from the chamber 12^b. As explained above, the seating of valve 21 is accomplished automatically in the seating of the cap 22 to house the pen point. In such application of the cap, most fountain pen users customarily invert the pen, so that the pen point is more or less elevated above the ink reservoir. This will cause some of the ink in chamber 12^b to return to the reservoir. However, it is desirable that some quantity of ink be trapped in chamber 12^b when valve 21 is seated, this for the purpose of maintaining the ink feed channel and pen point in properly moist condition to facilitate and induce flow of a sufficient supply of ink to the pen point immediately the pen is put into use after removal of the cap. When the cap is properly seated, it forms in conjunction with the sleeve 12 a substantially air-tight housing for the pen point and feed bar, thus substantially precluding evaporation of ink from them and confining them in a properly humid atmosphere.

When the cap 22 is properly in place, the pen is effectively sealed against outflow of ink from the reservoir, and may be carried in the pocket in any position without danger of leakage. Even at its maximum, the amount of ink which may be left in the various outflow passages below valve 21 when that valve is seated is so limited as not to constitute a hazard, as, being relieved of the pressure head of ink in the reservoir, it is retained by the capillarity of the passages and the comb slots 16^d. As a consequence of these provisions against leakage, the ink feed channel may be made of very liberal size, for the purpose of obtaining promptly and continuously an adequate flow of ink to the pen point for writing. It will be observed that the entire pen section, inclusive of the valve 21, may be removed for inspection or replacement of the parts very easily, 75

simply by unscrewing bushing 14 and removing it, together with the parts which it carries, from sleeve 12.

The modified construction illustrated in Figs. 6, 7 and 8 may be employed in conjunction with a barrel and filling mechanism as above described. Here the barrel is designated 10 and the sleeve is designated 42. The partition which the latter carries is extended downwardly for a short distance in the sleeve as a ring 43 of compressible elastic material such as rubber. The bushing 44 has the feed bar 46 and pen point 47 tightly fitted therein, together with the valve slide 48, which is mounted and operable in the same fashion as the valve 18. A slot 44^a affords communicating passage between the ink channel 46^a and the aperture of the partition member 43. The valve 51 is formed as a laterally turned portion of the valve slide 48, and has a conically shaped upper face of somewhat greater diameter than the aperture of the member 43.

When the pen cap is removed, the valve and valve slide are held in the position illustrated in Fig. 6 by the spring 49, so that ink may flow from the ink reservoir through the aperture of the member 43 and slot 44^a to the ink feed channel, for writing. When the pen cap is seated, the valve and valve slide are held in the position illustrated in Fig. 7, wherein the valve is pressed in firm engagement with the elastic member 43, in such fashion as to fully close its aperture and cut off communication between the ink reservoir and the ink feed channel. The space below the seated valve forms a chamber 42^b which will accommodate a small quantity of ink, for the purpose above described, said chamber in the embodiment here illustrated being of smaller capacity than the chamber 12^b in the embodiment first above described. This modified construction has the several advantages above pointed out with respect to the other embodiment, with the further advantages of being somewhat simpler and more economical in material and manufacture, and being entirely free of obstructions to flow of ink from the reservoir to the ink feed channel and passage of air bubbles from the ink feed channel to the reservoir.

What I claim is:

1. In a fountain pen, in combination, a pen body affording an ink reservoir, a pen point and a feed bar carried at the lower end of the body, said feed bar affording an ink feed passage, a slide movable longitudinally of the feed bar and having a portion extending exteriorly of the body at one side of the feed bar, and a valve movably housed in the body above the feed bar and operable by said slide to close off the reservoir from said ink feed passage, and spring means housed below the upper end of the feed bar and cooperating with the slide to move the valve to open position.

2. In a fountain pen, a combination as specified in claim 1 and including a cap adapted for attachment to the body in a position housing the pen point and having an annular shoulder for sealing engagement with the end of the body and an annular shoulder for cooperation with the slide to hold the valve in its closed position.

3. In a fountain pen, a combination as specified in claim 1 and including a cap adapted for screw-thread attachment to the pen body to house the pen point, said cap having an annular portion adapted to ride on the slide to stress the spring, and close the valve incident to the screwing on of the cap.

4. In a fountain pen, the combination with a

tubular body member having an ink reservoir, of a bushing removably mounted in the end of said body, a feed bar and pen point mounted in the bushing, a slide mounted for longitudinal movement in the bushing alongside the feed bar with its lower end outside the feed bar and extending beyond the lower end of the bushing, and a valve operably associated with the upper end of said slide.

5. In a fountain pen, a combination as specified in claim 4 and including a spring seated in the bushing below the upper end of the feed bar and cooperating with the slide to oppose upward longitudinal movement thereof.

6. In a fountain pen, a combination as specified in claim 4 and wherein the valve is carried on the slide and is located approximately coaxially with the feed bar and the body member.

7. In a fountain pen, a combination as specified in claim 4 and including a valve seat in the body member and affording an aperture communicating with the ink reservoir, said valve being movable into engagement with said seat by operation of said slide to close said aperture.

8. In a fountain pen, the combination of a feed bar having a longitudinally extending ink feed channel in one side thereof, a slide movable longitudinally of the feed bar along another side thereof, and means retaining said feed bar and slide in assembled relationship, said feed bar being formed at its upper end to provide an extension of said ink feed channel terminating adjacent said slide.

9. In a fountain pen having a barrel affording an ink reservoir, a sleeve mounted at the lower end of the barrel having a transverse partition member adjacent its upper end, said partition member being provided with an aperture, a bushing removably mounted in said sleeve, a feed bar and pen point mounted in said bushing, a valve housed in said sleeve and adapted for cooperation with said partition member to close said aperture, and a valve-operating member movably mounted in said sleeve and extending beyond the lower end thereof.

10. In a fountain pen, in combination, a body member affording an ink reservoir, a feed bar mounted in the lower end of said body member and having an ink feed channel for conducting ink to the pen point, said body member having a chamber accommodating flow of ink from the ink reservoir to said ink feed channel and passage of air bubbles from said ink feed channel to said reservoir, a valve movable in said chamber relative to the feed bar to close off said chamber from said reservoir, a spring segregated from said chamber and reservoir and urging said valve to open position, and a slide operable from the exterior of the body member to move said valve to closed position against the pressure of said spring.

11. In a fountain pen having a body portion with an ink reservoir and a pen cap adapted to be seated on the lower end of said body portion, the combination of a feed bar and pen point secured in fixed relative position in the lower end of the body portion and projecting therefrom, said feed bar having an ink channel arranged to receive ink from the reservoir, a valve operable to close off the reservoir from said channel, and a valve slide extending along the under side of the feed bar and movable relative thereto to operate said valve, said valve slide having an end projecting beyond the lower end of the body portion under the feed bar in position to be engaged

by the cap and moved to close the valve in the operation of seating the cap on the lower end of the body portion.

12. In a fountain pen having a body portion with an ink reservoir and a pen cap adapted to be seated on the lower end of said body portion, the combination of a pen point and feed bar secured in fixed relative position in the lower end of the body portion, said feed bar having an ink channel arranged to receive ink from the reservoir, a valve slide extending along the under side of the feed bar and movable longitudinally relative thereto, a valve carried on the rear end of the valve slide beyond the rear end of the feed bar and movable by said slide to a position where it closes off the reservoir from the feed bar, a spring cooperating with said slide to hold the valve in the open position, and said slide having an end portion projecting beyond the lower end of the body portion under the feed bar in position to be engaged by the cap and moved longitudinally of the feed bar against the pressure of said spring in the operation of seating the cap on the lower end of the body portion.

13. In a fountain pen having a body portion with a feed bar and pen point secured in fixed relative position therein, an ink reservoir for

supplying ink to said feed bar, a valve slide extending along the under side of the feed bar and movable longitudinally thereof, the rearward end of said slide extending rearwardly beyond the feed bar and the forward end of said slide extending forwardly beyond the lower end of the body portion below the feed bar and being deflected outwardly, a spring cooperating with said slide to press it forwardly, a valve operable by the slide to the rear of the feed bar, and means with which said valve cooperates to close off the reservoir from the feed bar when the slide is in a rearward position.

14. In a fountain pen having a body portion with a feed bar and pen point secured in fixed relative position therein and an ink reservoir for supplying said feed bar, a valve slide extending along the under side of the feed bar and movable longitudinally thereof, the rearward end of said slide having an inwardly deflected portion to the rear of the feed bar and the forward end of said slide having an outwardly deflected portion beyond the forward end of the body portion below the feed bar, a spring cooperating with said slide to press it forwardly, and a valve operable by the slide to close off the reservoir from the feed bar.

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