Aug. 13, 1935. H. A. FUNK 2,011,516

FOUNTAIN PEN

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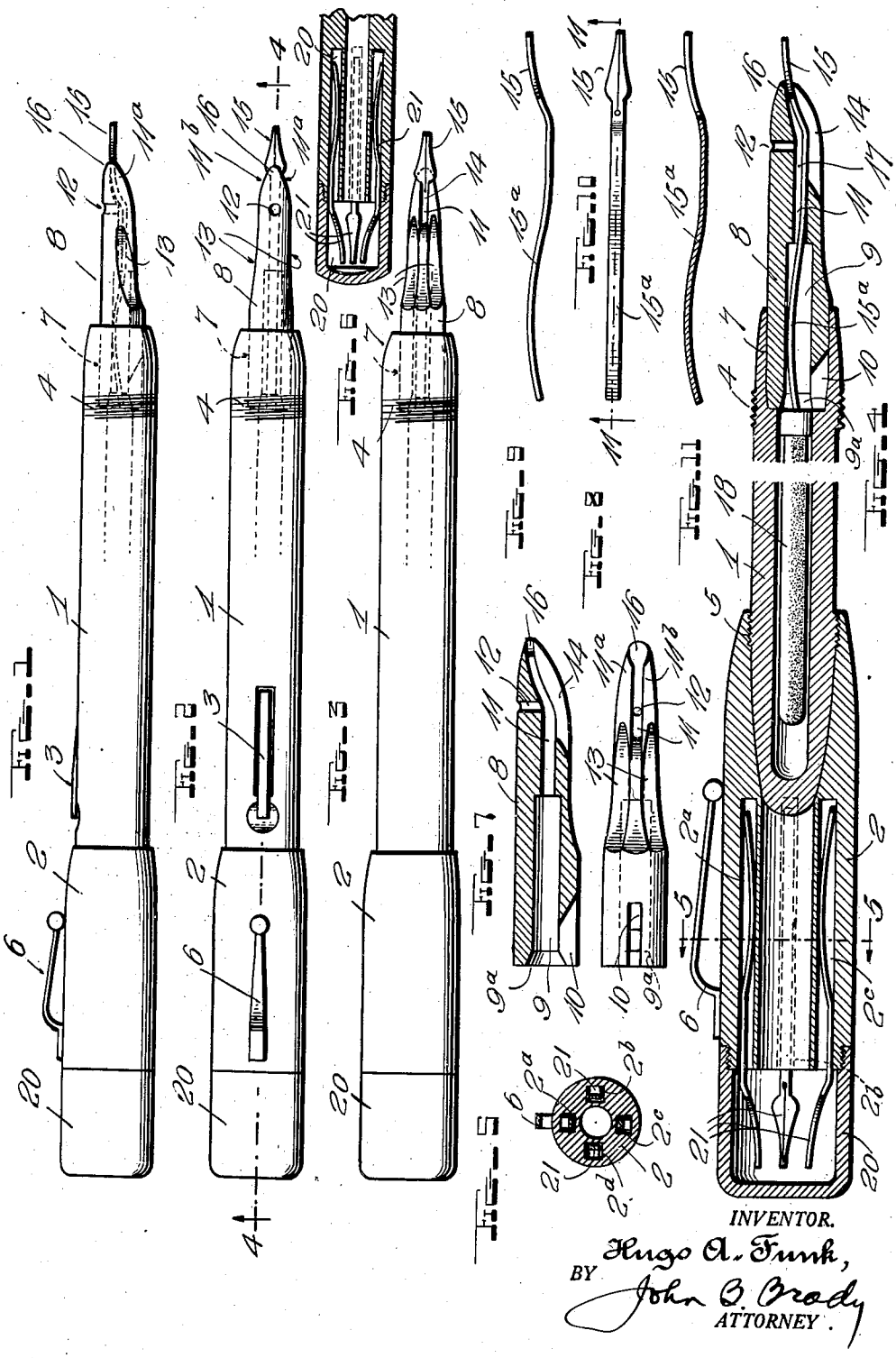

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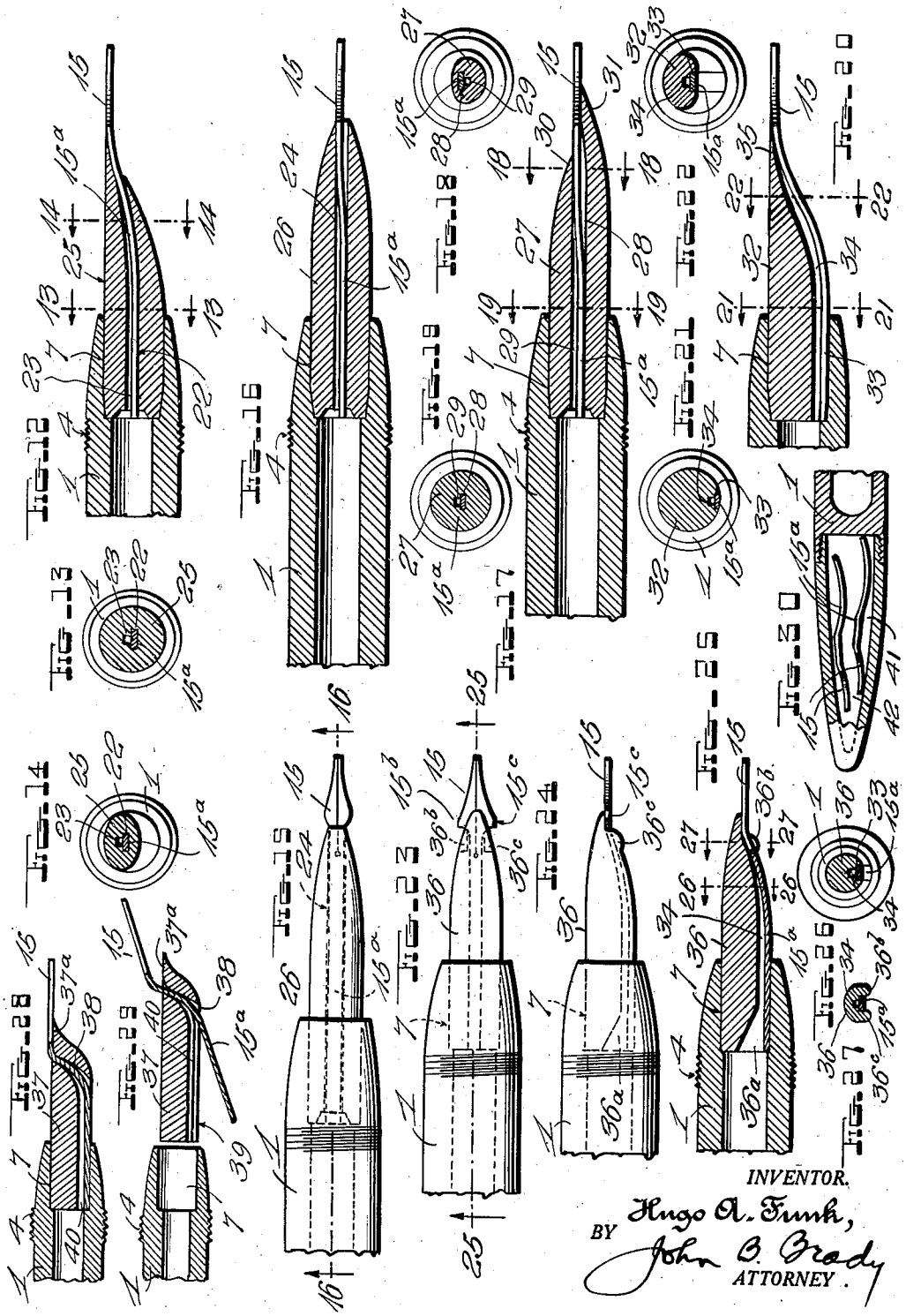

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FOUNTAIN PEN

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13 Claims. (Cl. 120—50)

My invention relates broadly to fountain pens and more particularly to the construction of an inexpensive type of fountain pen having a readily replaceable nib.

One of the objects of my invention is to provide an inexpensive construction of fountain pen including a magazine for carrying a multiplicity of replacement nibs which may be readily mounted in the pen for replacing the worn nib.

Another object of my invention is to provide a construction of fountain pen employing a type of steel nib which may be readily removed and reinserted in the pen without the use of tools for insuring maximum ease and efficiency in writing.

Still another object of my invention is to provide a construction of fountain pen having a readily replaceable nib formed from non-corrosive steel as distinguished from gold nibs for providing an efficient writing point at the same time that the cost is maintained low.

A further object of my invention is to provide a construction of fountain pen wherein the nib is formed integral with an ink feeder for insuring the uniform feeding of ink to the writing point by capillary attraction by a minimum number of parts.

A still further object of my invention is to provide a construction of replaceable nib and integrally formed ink feeder which may be carried in a plug member in the end of a fountain pen where the ink feeder is so formed that the feed channel is automatically cleaned by the removal and replacement of the nib.

Another object of my invention is to provide a refillable fountain pen comprising a plug member for the end of the pen barrel and a replaceable nib extending through a feed channel in the plug member so arranged that the pen can be filled by simply immersing the tip of the feed channel into the ink and performing a filling operation without soiling the pen barrel.

Still another object of my invention is to provide a construction of replaceable nib for fountain pens wherein lateral projections are provided on the nib for facilitating the removal of the nib when it is necessary to replace the nib.

A further object of my invention is to provide a construction of plug for the end of a pen barrel wherein the plug is grooved to coact with a replaceable nib for permitting ready removal and insertion of the nib in the plug while preventing lateral displacement of the nib with respect to the plug during writing operations.

Other and further objects of my invention reside in the construction of an improved fountain pen and magazine carrier therefor as set forth more fully in the specification hereinafter following by reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a fountain pen constructed in accordance with my invention; Fig. 2 is a top plan view thereof; Fig. 3 is a bottom plan view of the pen; Fig. 4 is a central vertical longitudinal sectional view on an enlarged scale taken on line 4—4 of Fig. 2 and showing more particularly the magazine for the spare nibs arranged within the cap; Fig. 5 is a transverse vertical sectional view taken on line 5—5 of Fig. 4; Fig. 6 is a fragmentary longitudinal sectional view of the rear end of a fountain pen barrel showing the same recessed for the reception of a number of spare nibs; Fig. 7 is a longitudinal sectional view of the detachable nib holding plug; Fig. 8 is a bottom plan view thereof; Fig. 9 is a side elevation of one of the detachable nibs; Fig. 10 is a plan view thereof; Fig. 11 is a longitudinal sectional view taken on line 11—11 of Fig. 10; Fig. 12 is a fragmentary sectional view showing a modified form of the detachable nib holding plug; Fig. 13 is a transverse vertical sectional view taken on line 13—13 of Fig. 12; Fig. 14 is a transverse vertical sectional view taken on line 14—14 of Fig. 12; Fig. 15 is a fragmentary plan view showing a modification of the detachable nib holding plug; Fig. 16 is a central vertical longitudinal sectional view taken on line 16—16 of Fig. 15; Fig. 17 is a central vertical longitudinal sectional view showing another modification of the detachable nib holding plug; Fig. 18 is a transverse vertical section taken on line 18—18 of Fig. 17; Fig. 19 is a transverse vertical sectional view taken on line 19—19 of Fig. 17; Fig. 20 is a central vertical sectional view showing still another modification of the detachable nib holding plug and adjacent parts; Fig. 21 is a transverse vertical sectional view taken on line 21—21 of Fig. 20; Fig. 22 is a transverse vertical sectional view taken on line 22—22 of Fig. 20; Fig. 23 is a plan view of still another modification of my improved detachable nib holding plug and co-acting modified form of nib; Fig. 24 is a side elevation thereof; Fig. 25 is a central vertical longitudinal sectional view taken on line 25—25 of Fig. 23; Fig. 26 is a transverse vertical sectional view taken on line 26—26 of Fig. 25; Fig. 27 is a transverse vertical sectional view taken on line 27—27 of Fig. 25; Fig. 28 is a central vertical longitudinal sectional view showing still another modification of the detachable nib holding plug and the nib carried thereby; Fig. 29 is a

view with the forward end of the pen barrel and the detachable nib holding plug shown in juxtaposition, the nib being shown in the act of being inserted in the plug; and Fig. 30 is a fragmentary longitudinal sectional view of a portion of a desk style fountain pen having a detachable hollow cap for carrying a number of replacement nibs.

Referring to the drawings in detail, reference character 1 designates the pen barrel which carries a cap 2 on one end thereof. The pen barrel has been illustrated as the barrel of a typical refillable pen having a reservoir control lever as shown at 3. The end of the barrel 1 is screw threaded as represented at 4 for receiving coacting screw threads 5 on the interior of the cap 2 when the cap 2 is inserted over the writing end of the pen when the pen is not in use. A clip 6 is provided for facilitating the carrying of the pen when the pen is not in use. The writing end of the barrel 1 has a cylindrical recess 7 therein for receiving a readily insertable plug 8. The plug 8 is shaped to snugly fit the cylindrical recess 7 and to provide a fluid tight connection therewith. As shown in Fig. 7, there is a cylindrical passage 9 extending axially of the plug for approximately one-half the total length thereof.

The removable plug 8 is provided with a slot 10 adjacent the inner end thereof in that portion of the plug which is normally the lowest position of the plug during a writing operation. The end of the passage 9 is cut at an angle as represented at 9a to coact with the slot 10 for insuring the feeding of ink into the passage 9 when the pen is held in writing position. The plug 8 is provided with a groove 11 extending axially from the end of the passage 9 and terminating at the end of the plug 8 in opposed jaws designated at 11a and 11b. Plug 8 is apertured at 12 for providing an air passage which facilitates the uniform feeding of the ink and also provides an intake passage for the ink during the filling operation of the pen. The portion of the plug 8 adjacent the end of the groove 11 and the opposed jaws 11a and 11b is grooved at 14 for facilitating the insertion and removal of the pen nib 15. To increase the lightness of the plug 8 and render the same more convenient for writing, the plug is cut away on opposide sides thereof as shown at 13.

Figs. 9, 10, and 11 show the removable pen nib employed in the pen of my invention. The nib 15 is formed integral with the feed strip 15a. The feed strip 15a and nib 15 are integrally formed from resilient steel and so shaped as shown in the drawings that by the mere insertion of the nib through the groove 11 and passage 9, the nib will tend to straighten out and be frictionally maintained in position in the plug 8. The nib 15 and feed strip 15a are originally given such a bowed formation that insertion of the strip within the plug 8 brings into play forces tending to straighten out the feed strip and nib and thus frictionally maintain the nib in position in the plug 8. The tip 16 of the plug serves as an abutment which resists the force which is placed upon the nib 15 during a writing operation.

As shown more particularly in Fig. 4, the bowed portion of the feed strip 15a contacts with the inner cylindrical wall of the passage 9 in one direction while in the opposite direction the strip 15a contacts with one wall of the passage 11. This provides a feed passage along the strip 15a. The natural bowed formation of strip 15a provides a channel 17 immediately beneath the air hole 12 which facilitates feeding of the ink during the writing operation and provides a direct passage for the ink into the reservoir 18 during a filling operation. While I have not shown the detailed structure of the reservoir and the actuator interconnecting the lever 3 with the reservoir 18, it will be understood that any preferred form for such a reservoir may be employed and that I am not limited in the selection of the structure of the reservoir.

The cap of the pen which I have illustrated at 2, is provided with an internally screw threaded closure, as shown at 20. There are longitudinally extending pockets 2a, 2b, 2c, and 2d provided in the wall of cap 2 as shown more clearly in Figs. 5 and 6. These pockets serve as a magazine for receiving extra pen nibs which I have designated generally at 21. These extra or spare pen nibs are of the same shape and contour as the pen nib 15 and have such inherent resiliency that the extra nibs may be maintained in position in the pockets 2a, 2b, and 2c for preventing relative movement of the spare nibs and resulting injury thereto. That is to say, the bowed portions of the spare nibs, when inserted in the pockets in the walls of the cap, provide means for locking the spare nibs in position in the cap and preventing displacement thereof.

In Fig. 12 I have shown a structure of pen embodying my invention in which a plug 25 has a central passage 22 extending therethrough where the passage is in the form of a groove of rectangular section shown more particularly in Figs. 13 and 14, within which the ink feed strip 15a of nib 15 snugly fits. In order to provide for the feeding of ink there is a channel 23 for ink directly adjacent the passage 22. This channel 23 extends to the end of the plug 25 and serves as a means for facilitating the feeding of ink during a writing operation and as a means for guiding the ink to the reservoir during a filling operation.

Fig. 15 shows another modified form of pen embodying my invention in which a detachable plug 26 for the end of pen barrel 1 is provided, wherein the passage through the plug is disposed axially of the plug throughout the length thereof. In this construction, shown more clearly in Fig. 16, the passage through the plug 8 is represented at 24 directly in alignment with the longitudinal axis of the pen. The passage 24 is rectangular in cross section and is provided with an adjacent ink feeding channel similar to the structure shown in Figs. 13 and 14. By virtue of the axial disposition of the groove 24 through the plug 26, the nib has its bowed ink feed strip portion 15a flattened out and maintained frictionally in position in the pen as shown.

Fig. 17 shows another modified form of pen embodying my invention wherein a plug 27 has a central rectangular passage 28 extending therethrough and serving as a guide for the replaceable pen nib 15. The ink feed strip 15a of the pen nib 15 is confined within the groove 28. The ink feed passage 29 extends immediately adjacent the ink feed strip 15a. The plug 27 has one side thereof terminating at 30 and the opposite side terminating at 31, and each serving as bearing supports for the nib 15. The ink flows along passage 29 which actually crosses the axial path of the passage 15a thereby insuring the proper feeding of ink both in the writing operation and in a refilling operation.

Figs. 18 and 19 are cross sectional views showing the relative location of the ink feeding passage 29 with respect to the passage 28 which receives the ink feed strip 15a of the pen nib 15.

Fig. 20 shows a further modified form of pen embodying my invention. In this arrangement a replaceable plug 32 is provided with a groove 33 adjacent one side thereof and immediately beneath this groove a channel 34 is cut to provide a passage for ink along the ink feed strip 15a of the pen nib 15. A supporting surface is provided for the pen nib 15 as represented at 35, at the end of the plug 32. The relative position of the ink feed strip 15a and the groove 33 and channel 34 will be seen more clearly in Figs. 21 and 22 which are cross sectional views taken on correspondingly numbered lines in Fig. 20.

In order to facilitate the replacement of the pen nib when the nib has become worn, I may provide lateral projections on the edges of the pen nib as shown more particularly in Figs. 23, 24, 25, and 26. In this arrangement a plug 36 is carried in the end of the pen barrel, which end is provided with side grooves similar to the arrangement illustrated in Fig. 20, that is, an external groove 33 is provided for the passage of the ink feed strip 15a of pen nib 15. Immediately above the ink feed strip 15a in passage 33 there is an ink feed channel 34. In order to facilitate the passage of ink from the pen barrel through the plug 36 an angularly cut slot 36a may be formed in plug 36 as represented in Fig. 25. The distinctive features of construction in the form of the invention illustrated in Figs. 23—26 is that the pen nib 15 has laterally extending projections 15b and 15c. By gripping the projections 15b and 15c the pen nib may be readily withdrawn from the plug 36 and a fresh pen nib inserted. In order to avoid lateral displacement of the pen nib I provide projections 36b and 36c on the plug 36, thereby firmly anchoring the pen nib in position during writing operations.

The cross sectional view taken on line 27—27 of Fig. 25 illustrates the manner in which the pen nib is maintained in position while no obstruction is offered to the passage of ink along channel 34.

In another of the forms of the pen of my invention I find it desirable to lock the pen nib in position by an arrangement illustrated in Figs. 28 and 29 wherein the plug 37 is insertable into the recess 7 in the end of the pen barrel 1. Plug 37 has a passage extending angularly therethrough and adjacent one end thereof as represented at 38. The plug 37 is grooved at 39 to receive the ink feed strip 15a of pen nib 15 and is provided with an adjacent ink passage 40 immediatley adjacent the groove 39. The ink which is carried by capillary attraction along the ink feed 15a passes through port 38 to pen nib 15 for delivery from the writing point. In filling the pen it is only necessary that the end of the plug 37 be immersed in an ink reservoir or well, to permit the fluid to be drawn up through the passage 38 and channel 40 into the reservoir in the pen. The end 37a of plug 37 provides a support for the pen nib 15.

In desk type pens as distinguished from a fountain pen which is carried in the pocket, I may find it desirable to form the magazine for additional pen nibs in the end of the pen barrel without providing longitudinal pockets in the pen barrel. This arrangement is shown more particularly in Fig. 30 wherein the end of the pen barrel 1 has a cap 41 connected thereto, which cap provides a receptacle 42 for spare pen nibs 15 which I have indicated therein.

The structure of my invention is applicable both to a self-filling fountain pen and a drop filling pen of large capacity. The pen nib can be very cheaply made from Monel metal, steel or rust resisting metal, and will give service which is often more satisfactory than an expensive gold pointed pen. By reason of the small number of parts constituting the pen of my invention, the structure is particularly adapted for quantity production at very low cost.

While I have described my invention in certain preferred embodiments, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A fountain pen comprising a barrel structure having a cylindrical recess in one end thereof, a plug member removably secured in the cylindrical recess in said barrel member, said plug member having a channel formed therein, a pen nib, a preformed resilient strip of substantially rectangular cross-section integrally connected with said pen nib, said strip being insertable through the channel in said plug member and being deformable from its preformed shape for establishing interlocked frictional engagement on its opposite flat sides with the interior walls of the channel through said plug member.

2. In a fountain pen, a barrel structure, a plug member fitted into said barrel structure, a channel extending through said plug member and terminating in a nib support at the end thereof, and a pen nib having a longitudinally extending ink feed strip of substantially rectangular cross-section thereon projectible through the channel in said plug member, said strip being bowed in opposite directions for establishing frictional engagement with the interior walls of the channel through said plug member, said pen nib directly contacting between its flat sides and the nib support in the end of said plug.

3. A fountain pen comprising a barrel structure recessed at one end thereof, a plug member insertable into the recessed end of said barrel structure, said plug member having a canal extending therethrough and terminating in a nib bearing surface at the end thereof, a pen nib having a longitudinally extending strip of substantially rectangular cross-section integrally connected therewith, said strip being insertable through the canal in said plug member, said strip member being preformed and being deformable out of shape in its passage through the canal in said plug member for establishing frictional engagement between the flat sides of said strip and the interior walls of the said canal, the pen nib directly contacting with the nib support at the end of said plug member.

4. In a fountain pen, a barrel structure, a plug member detachably engaging the end of said barrel structure, an ink channel extending through said plug member, a pen nib having an ink feed strip of substantially rectangular cross-section integrally connected therewith, said ink feed strip being preformed with a bowed resilient portion therein whereby said pen nib may be maintained in position in the ink channel in said plug member by means of the binding engagement of the flat sides of the resilient bowed portion of said ink feed strip with the interior walls of said ink channel.

5. In a fountain pen, a barrel, a plug secured in the end of said barrel, said plug having a pair of channel ways extending therethrough, a pen

nib having an integrally connected ink feed strip of substantially rectangular cross-section, said ink feed strip being engaged in one of said channel ways with the flat surface thereof in engagement with the channel way for establishing an ink feeding path through the adjacent channel way.

6. In a fountain pen comprising a barrel structure, a plug engaging the end of said barrel structure, said plug having a channel extending therethrough and terminating in a nib supporting portion, a pen nib, an ink feeding strip of substantially rectangular cross-section integrally connected with said pen nib, said ink feeding strip having a resilient bowed portion preformed in a direction coinciding with the longitudinal axis of said pen nib for establishing an interlocking connection between the flat sides thereof and the channel through said plug member.

7. In a fountain pen, a barrel structure recessed at one end thereof, a plug projecting into said recessed barrel structure, said plug having a channel way extending therethrough, a pen nib having an ink feeding strip of substantially rectangular cross-section integrally connected therewith, said strip being resiliently bowed out of alignment between the flat sides thereof and said pen nib for establishing interlocking engagement with the interior walls of said channel way, and a pair of guide lugs formed adjacent the end of said plug and projecting on opposite sides of said ink feed strip for preventing lateral displacement of said pen nib during a writing operation.

8. A fountain pen comprising a barrel structure, a plug member carried by one end of said barrel structure, said plug member having a channel extending therethrough, a pen nib having an ink feed strip of substantially rectangular cross-section integrally connected therewith, said ink feed strip being preformed to provide a resilient bowed portion having the flat sides thereof flattened against the interior walls of said channel when said ink feed strip is inserte through said channel, and means carried by said plug member for preventing lateral displacement of said pen nib during a writing operation.

9. A fountain pen comprising a barrel structure, a plug member carried by one end of said barrel structure, said plug member having a channel extending therethrough, a pen nib having an ink feed strip of substantially rectangular cross-section integrally connected therewith, said ink feed strip being preformed to provide a resilient bowed portion having the flat sides thereof flattened against the interior walls of said channel when said ink feed strip is inserted through said channel, a pair of lugs integrally connected with said plug member adjacent the end thereof and projecting on opposite sides of said ink feed strip for preventing lateral displacement of said pen nib during a writing operation.

10. In a fountain pen, a barrel structure, a plug closing one end of said barrel structure, said plug having a channel extending therethrough, said channel having a substantially rectangular cross-section, a removable pen nib, an ink feed strip integrally connected with said pen nib, said ink feed strip having a cross-section substantially conforming with the cross-section of said channel, said strip having the flat surface thereof in surface contact with the walls of said channel, an auxiliary channel extending immediately adjacent the aforesaid channel and having a cross-section substantially less than the cross-section of the aforesaid channel and providing a passage for ink to said pen nib and a supporting surface for said pen nib at the extremity of said plug.

11. In a fountain pen, a barrel structure, a removable plug closing one end of said barrel structure, a channel way extending axially through said removable plug, a pen nib having an ink feed strip of substantially rectangular cross-section connected therewith, said ink feed strip having a substantially sinusoidal contour and having such resiliency that when said ink feed strip is inserted through said channel way, said strip will be substantially flattened between the walls of said channel way and maintained in position therein with the flat sides of said strip in frictional engagement with the walls of said channel way.

12. In a fountain pen, a barrel structure, a plug member closing the end of said barrel structure, said plug member having a longitudinally extending rectangular slot therein and an adjacent slot of smaller cross-section therein, a pen nib having an ink feed strip of substantially rectangular cross-section connected thereto, said ink feed strip having a substantially sinusoidal contour and having such resiliency that said ink feed strip has the flat sides thereof flattened against the inner walls of said first mentioned slot when said pen nib is inserted in said plug member for maintaining said pen nib in position in said plug member while permitting the feeding of ink through said slot of smaller cross-section.

13. In a fountain pen, a barrel structure, a plug member engageable through one end of said barrel structure, said plug member having a passageway extending therethrough, a replaceable pen nib having an ink feed strip of substantially rectangular cross-section insertable through said passageway, said ink feed strip being bowed with respect to the axis of said passageway and having such inherent resiliency that when said ink feed strip has the flat sides thereof flattened against the inner walls of said passageway, said pen is securely maintained in position.

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