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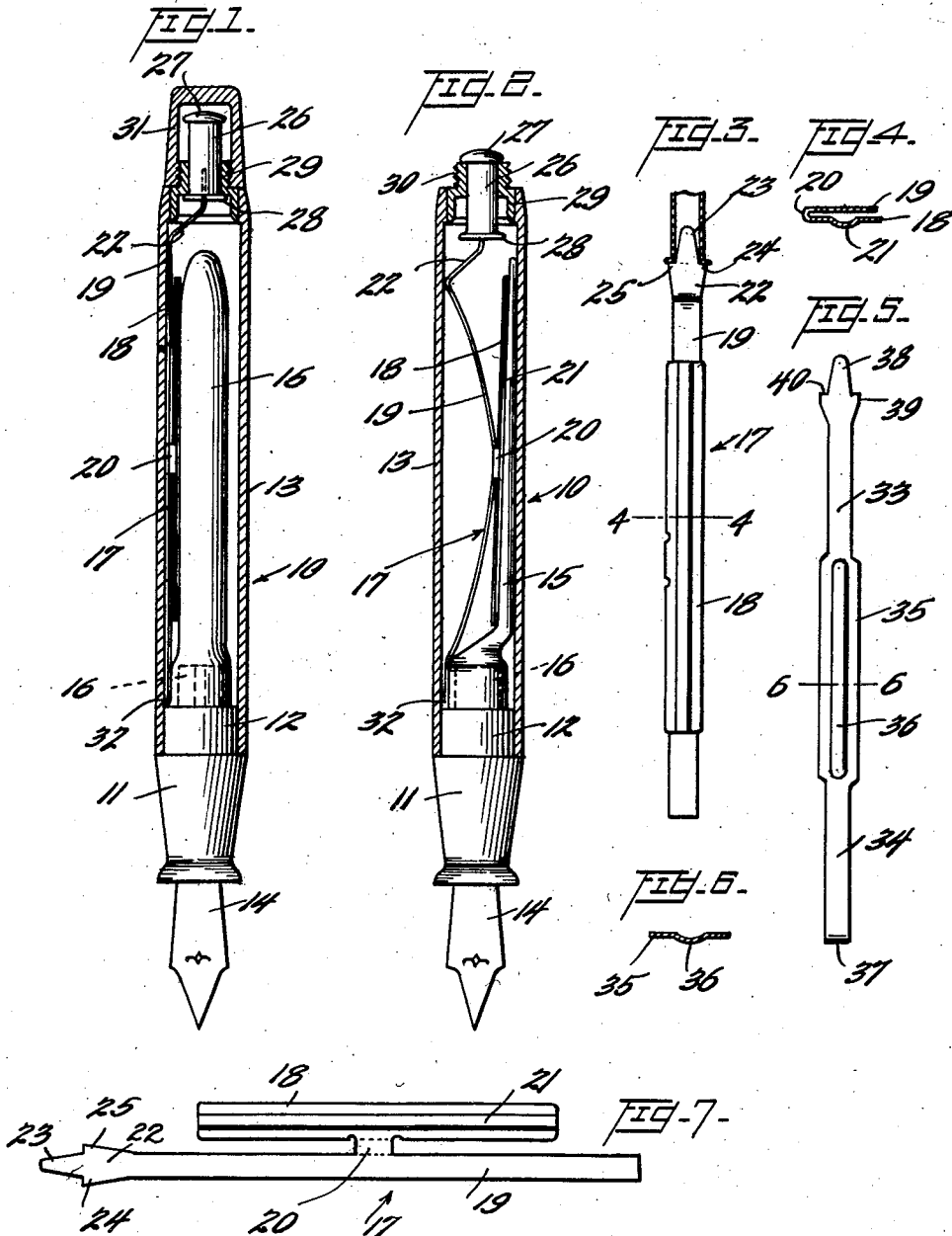
J. W. PARA ET AL

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FOUNTAIN PEN PRESSER BAR AND METHOD OF PRODUCING THE SAME

Filed May 6, 1942

2 Sheets-Sheet 1



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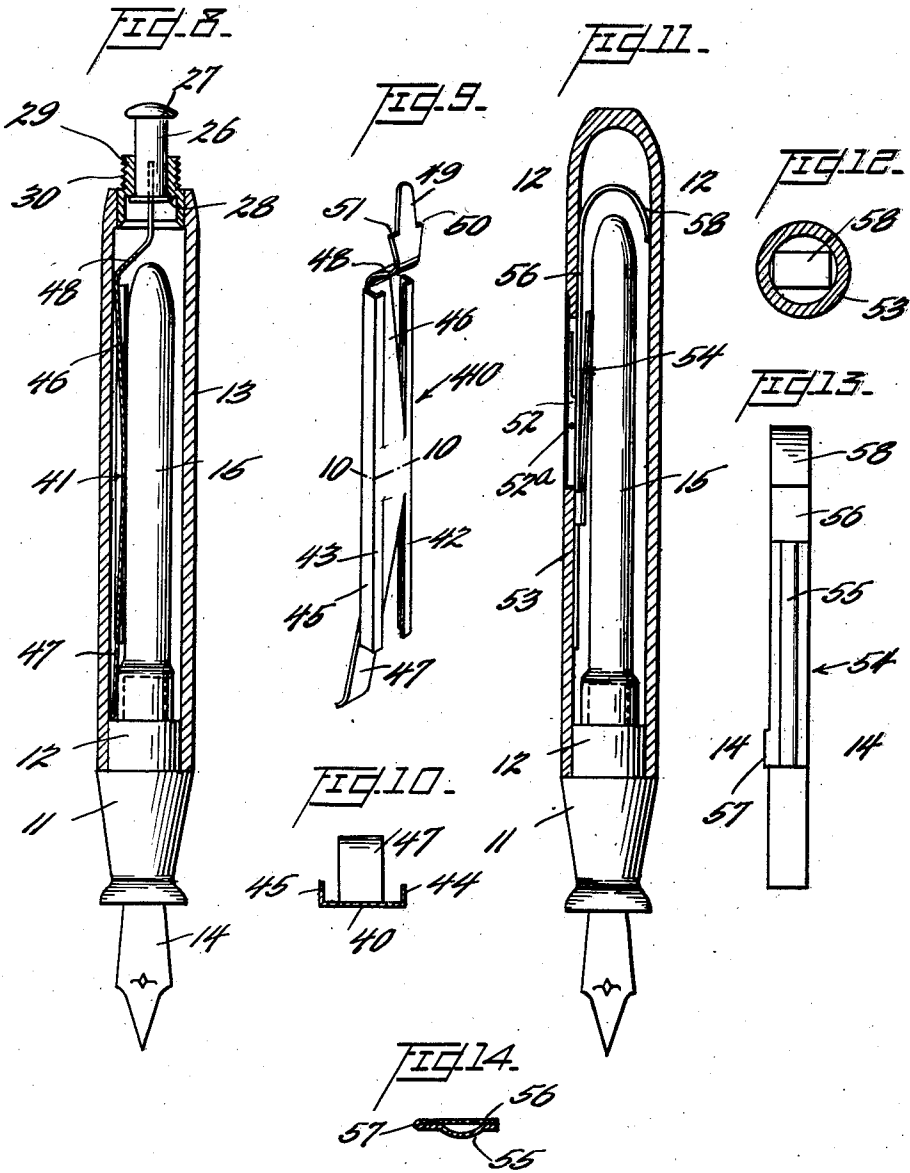
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# UNITED STATES PATENT OFFICE

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## FOUNTAIN PEN PRESSER BAR AND METHOD OF PRODUCING THE SAME

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The present invention relates to a fountain pen presser bar and method of producing the same.

More particularly, the present invention relates to a one-piece presser bar construction especially suitable for fountain pens of the automatic filler type which are provided with the usual rubber collapsible sac.

In fountain pens of the character described, it has been customary to provide a bar of relatively flat metal for compressing the rubber sac of the pen in order to expel air therefrom so that when the bar was moved from the sac, the same would expand to suck ink into the sac from an ink bottle or well. In general, the presser bar was moved toward the rubber sac to compress the same manually and upon release of the manually moved portion of the filler device, a spring moved the bar away from the sac to allow the same to expand. The bar necessarily was formed of relatively rigid material or was so shaped as to be substantially rigid. The spring, on the other hand, which was linked to the bar and moved the same away from the sac, was necessarily flexible and was generally formed of a spring steel material. It was customary to form the spring of spring steel and the bar of a relatively rigid metal not possessing spring characteristics, such as brass. Necessarily, therefore, there were certain difficulties encountered in assembling and fabricating the presser bar and spring assembly within the narrow confines of a fountain pen barrel.

It is one of the objects of the present invention, therefore, to provide a presser bar and spring integrally formed of a single piece of metal.

A second object of the present invention is to form a presser bar and spring assembly in which the presser bar proper is substantially rigid and the spring relatively flexible, both the spring and presser bar being formed of the same material.

A third object of the present invention is to provide a presser bar and spring construction in which the bar and spring are disposed in substantial parallelism with one another and integrally connected at an intermediate section thereof.

A fourth object of the present invention is to provide a presser bar and spring construction which is particularly adapted to be used in a fountain pen provided with a push button at the upper end thereof and which may be easily and conveniently assembled with the said push button and fountain pen barrel.

A fifth object of the present invention is to

provide a presser bar and spring construction in which the spring portion is substantially resilient and the presser bar portion is substantially rigid and provided with a rigidity imparting longitudinally disposed rib or the like.

A sixth object of the present invention is to provide a presser bar construction integrally formed of mild steel or the like which is capable of being easily formed into the required shape and can be thereafter hardened and tempered to sufficiently resilient characteristics for use as a presser bar and spring assembly.

A seventh object of the present invention is to provide a novel process for the production of an integral presser bar and spring assembly comprising cutting a blank including a connected bar portion and spring portion, stamping a stiffening rib in the bar portion, bending said blank so that the spring and bar portion are in substantially parallel planes and connected by the connecting portion, and finally hardening and tempering the blank to impart resiliency to the spring portion.

An eighth object of the present invention is to provide a process for producing an integral presser bar and spring which includes the steps of cutting a blank from soft steel, stamping a stiffening rib in the blank, and otherwise completely forming the same prior to a hardening and tempering step.

Other objects and advantages of the present invention will be apparent from the subsequent description and figures of the drawings, wherein:

Figure 1 is a vertical section of a fountain pen embodying one form of the present invention;

Figure 2 is a section similar to Fig. 1 with the presser bar acting against the sac of the pen;

Figure 3 is a plan view of the presser bar assembly with the presser button shown in section;

Figure 4 is a section on the line 4-4 of Fig. 3;

Figure 5 is a plan view of a modified form of the invention;

Figure 6 is a section on the line 6-6 of Fig. 5;

Figure 7 is a plan view of a presser bar and spring assembly prior to bending into final form;

Figure 8 is a vertical section of a pen including a third modified form of the invention;

Figure 9 is a prospective view of the presser bar assembly of Fig. 8;

Figure 10 is a section taken on line 10-10 of Fig. 9;

Figure 11 is a vertical section of a pen including a fourth form of the invention;

Figure 12 is a section taken on line 12-12 of Fig. 11;

Figure 13 is a plan view of the presser bar assembly of Fig. 11; and

Figure 14 is a section taken on line 14—14 of Fig. 13.

Referring to the drawings, and particularly Figure 1 thereof, a fountain pen is indicated in general by the reference numeral 10 and provided with the usual nozzle 11 having a reduced portion 12 fitted into the conventional barrel 13. Projecting from the nozzle is the usual nib 14 communicating with the interior of the sac 15 by means of a feed member indicated in dotted lines at 16. As shown in Fig. 1, the sac 15 is in expanded position and the presser bar and spring assembly indicated in general at 17 is in normal position prior to manual actuation. As shown particularly in Figs. 3 and 4, the presser bar assembly 17 consists of a presser bar proper 18 and a spring 19 connected by the portion 20. The presser bar proper 18 is provided with a rib 21 which is adapted to stiffen the same and prevent the bending thereof. The spring 19 is substantially more resilient, therefore, than the presser bar 18, and when subjected to axial pressure as shown in Fig. 2, is adapted to push the presser bar against the sac 15 to collapse the same. The upper end of the presser bar spring 19 is provided with a curved portion 22 and a reduced end portion 23 extending from a pair of shoulders 24 and 25, respectively. Seated on the shoulders 24 and 25 is a push button 26 having a head 27 and an expanded portion 28 adapted to limit its movement within a bushing 29. The bushing 29 is immovably fixed within the upper end of the barrel 13 and is provided with a reduced threaded portion 30 adapted to receive a cap 31 which is provided with internal threads cooperating with the threaded portion 30. The lower end of the spring 19 is also provided with a bent portion 32 which is adapted to rest against the upper end of the reduced nozzle portion 12 previously described. It will therefore be apparent that when the push button 26 is manually moved downwardly, the lower end 28 thereof will bear against the shoulders 24 and 25 and will bend the spring 19 as shown in Fig. 2. Through the connecting portion, the spring 19 will thereupon move the presser bar 18 against the sac 15 to collapse the same and force the air out of the sack 15 through the feed 16. When the push button 26 is released, the presser bar and spring assembly 17 will return to the position shown in Fig. 1 and the natural resilience of the rubber sac 15 will then cause the same to expand to create a partial vacuum within the sac. If the nib 14 is at this time inserted in a suitable source of ink, ink will be drawn into the sac 15. It is to be noted that the presser bar and spring are integral with one another and therefore may be conveniently formed from a single piece of metal. It will also be noted that even though both the presser bar and spring proper may be formed from the same piece of metal, the longitudinal rib 21 on the bar makes the same substantially rigid and therefore insures a relatively complete compression of the sac 15.

In Fig. 7, there is shown a blank of metal including a portion corresponding to the presser bar proper 18, the spring 19 and connecting portion 20. It will be noted that in this blank, the presser bar and spring are in substantially the same plane. In forming the integral presser bar and spring of the invention, a blank of the general form of Fig. 7 is cut from soft steel as an initial stage or step in the process. Thereafter,

the rib 21 is stamped in the presser bar portion 18. It is also possible to cut the blank and stamp the rib as a single operation.

A further step in the process involves bending the portion 22 to the form shown in Fig. 1. Thereafter, the presser bar portion 18 and spring portion 19 are positioned in parallel planes by bending the connecting portion 20. By utilizing soft steel for the operation, these steps may be easily performed utilizing standard tools or operating means. Thereafter, the entire assembly of spring and presser bar is preferably heated in an electric oven to a temperature of 1200° F. and suddenly quenched in a quenching bath of either water or oil maintained at room temperature. The hardened and somewhat brittle steel thus produced is tempered by heating to approximately 500° F., and thereafter cooled to form the final presser bar and spring assembly. It has been discovered that when soft steel is hardened and tempered in this manner, sufficient resiliency and strength will be imparted thereto so that the spring portion 19 will function properly as a filler spring for fountain pens. Prior to this discovery, it was thought necessary to form the filler spring of a high carbon spring steel similar to that ordinarily used in watch springs. It was not realized that the resiliency and strength of this form of steel were not entirely necessary and that a spring of hardened soft steel would be entirely suitable for the purpose. By making this discovery, therefore, it has been possible to form the spring and presser bar integrally from a single blank of metal in the manner just described. Although soft or mild steel is herein specified for the purpose, it is obvious that other metals and alloys may be used, provided these metals or alloys are capable of being easily worked initially to the proper form and thereafter are capable of being hardened to have a spring-like characteristic.

Further, while it is preferred that mild steel be used and heated to a temperature of 1200° F. for hardening and subsequently to a temperature of 500° F. for tempering, it is to be understood that with steels of different carbon content, other hardening temperatures and other tempering temperatures may be used. Inasmuch as in the process hereinbefore set forth, the metal is not worked after hardening and tempering, the resultant spring tends to be stronger and more durable in many instances than springs which have been previously used of high carbon spring steel.

In the modification of the device shown in Figs. 5 and 6, a combined presser bar and spring is shown formed integrally of a single strip of metal lying in normal position substantially in a single plane. In this modification of the invention, spring sections 33 and 34 are provided at each end of a presser bar section 35. As shown particularly in Fig. 6, the presser bar section 35 is provided with a stiffening rib 36. The lower end of the lower spring section 34 is also provided with a bent portion indicated at 37 having a similar function and shape to the portion 32 of the previously described modification. The upper end of the upper spring portion 33 is provided with a relatively narrow end 38 and with shoulders 39 and 40 which are adapted to cooperate with a presser button similar to the button 26 previously described. When the type of presser bar shown in Figs. 5 and 6 is subjected to an axial compressing movement, the two sections 33 and 34 are adapted to bend and force the central section

against the sac of the pen in which the combined presser bar and spring assembly is mounted. However, in this form of the invention, the presser bar, being necessarily of a shorter length, is incapable of as completely compressing the sac as the modification of Figs. 1 to 4.

A third modified form of the present invention is shown in Figs. 8, 9 and 10. Referring to Fig. 9, there is here shown a presser bar and spring assembly indicated in general at 41 and including a pair of presser bar sections 42 and 43. Each of the presser bar sections is provided respectively with reinforcing flanges 44 and 45 which serve to stiffen and prevent transverse bending of the presser bar sections. The presser bar sections 42 and 43 are integral at their mid-section with a spring portion consisting of an upper spring portion 46 and a lower spring portion 47 provided at its lower end with a bent portion similar in shape and adapted to function in a manner similar to the bent portion 32 of the spring 19. The upper spring portion 46 is provided with a bent portion 48 similar to the bent portion 22 of Fig. 3, a narrow portion 49 at the extreme upper end thereof, and shoulders 50 and 51. As shown in Fig. 8, the narrow portion 49 enters a presser button indicated at 26 and entirely similar to the presser button 26 of Figs. 1 to 3. Referring to Fig. 8, it will also be noted that the presser bar and spring assembly of this modification is mounted in a fountain pen entirely similarly to the first modification described. When the presser button 26 is moved downwardly in this modification, the spring portions 46 and 47 are bent and the relatively stiff presser bar portions 42 and 43 are forced against the sac 15 to compress the same. Here, again, however, since the presser bar portions 42 and 43 do not extend entirely across the diameter of the sac, there is not as complete a compression thereof as in the modification of Figs. 1 to 3.

The modification of the device shown in Figs. 11 to 14, inclusive, includes a presser bar and spring assembly which is adapted to be manually actuated by a conventional lever. Referring to Fig. 11, there is here shown a lever 52 which is pivoted at 52a to the pen barrel 53. As shown, the pen barrel of this modification is closed at the top and open at the bottom to receive the nozzle 11 and the sac 15, which are entirely similar to the nozzle and sac of Fig. 1. When the upper end of the lever is pulled outwardly, the lever pivots on the pivot 52a and the lower end is forced against a portion of the presser bar 54. As shown particularly in Fig. 14, the presser bar portion proper consists of a ribbed portion 55 and a relatively flat portion 56. The portions 55 and 56 are joined by a portion 57. The portion 56 functions as a spring and is provided with a bent end 58 at the upper end thereof which fits snugly within the upper end of the pen barrel so as to retain both the spring and presser bar in position. When the lever of the pen is operated, therefore, the rib portion 55 is pressed against the sac to compress the same and when the lever is leased, expansion of the sac will suck ink thereinto.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A presser bar and spring assembly for fountain pens or the like including an elongated spring portion, a presser bar portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and spring

portion, said connecting portion intermediate the ends of the spring portion being integral with said spring and presser bar portions.

2. A presser bar and spring assembly for fountain pens and the like including an elongated spring portion, a presser bar portion, a longitudinally extending rib imparting stiffness to said presser bar portion, and a portion connecting said presser bar and spring portions intermediate the ends of the spring portion, said connecting portion being integral with said spring and presser bar portion.

3. A presser bar and spring assembly for fountain pens or the like including an elongated spring portion, a presser bar portion in general parallelism with the spring portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar portion and said spring portion intermediate their ends, said connecting portion being integral with said spring and presser bar portions.

4. A presser bar and spring assembly for fountain pens or the like including an elongated spring portion, a presser bar portion in general parallelism with the spring portion, a longitudinally extending rib integral with said presser bar portion and imparting stiffness thereto, and a portion connecting said presser bar portion and said spring portion intermediate their ends, said connecting portion being integral with said spring and presser bar portions.

5. In a fountain pen including a barrel, a collapsible sac within said barrel, a hollow push button mounted for reciprocating movement in the upper end of said barrel, a presser bar and spring assembly within said barrel including an elongated spring portion, a presser bar portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and spring portion, said connecting portion being integral with said spring and presser bar portions, and means extending from said spring portion into said push button to connect said spring portion and push button.

6. In a fountain pen including a barrel, a collapsible sac within said barrel, a hollow push button mounted for reciprocating movement in the upper end of said barrel, a presser bar and spring assembly within said barrel including an elongated spring portion, a presser bar portion, a longitudinally extending rib imparting stiffness to said presser bar portion, and a portion connecting said presser bar and spring portions, said connecting portion being integral with said spring and presser bar portions, and means extending from said spring portion into said hollow push button to connect said push button and spring so that movement of said push button will bend said spring and move said presser bar portion against said collapsible sac to collapse the same.

7. In a fountain pen including a barrel, a collapsible sac within said barrel, a hollow push button mounted for reciprocating movement in the upper end of said barrel, a pressed bar and spring assembly including an elongated spring portion, a presser bar portion in general parallelism with the spring portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and said spring portion intermediate their ends, said connecting portion being integral with said spring and presser bar portions, and means to connect said push button and the upper end of said spring portion so that downward movement of said push button will exert an axial pressure upon said spring portion to bend

the same and force the presser bar portion against the collapsible sac to compress the same.

8. In a fountain pen including a barrel, a collapsible sac within said barrel, a hollow push button mounted for reciprocating movement in the upper end of said barrel, a presser bar and spring assembly including an elongated spring portion, a presser bar portion in general parallelism with the spring portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and said spring portion intermediate their ends, said connecting portion being integral with said spring and presser bar portions, and means to connect said push button and the upper end of said spring portion so that downward movement of said push button will exert an axial pressure upon said spring portion to bend the same and force the presser bar portion against the collapsible sac to compress the same, said last mentioned means including a shoulder on the upper end of said spring portion bearing against the lower end of the push button, and a tongue extending into said push button.

9. A presser bar and spring assembly for fountain pens or the like including an elongated spring portion, a pair of shoulders and a narrow tongue at the upper end of said spring portion, a presser bar portion in substantial parallelism with its spring portion, a longitudinal rib extending the length of said presser bar portion to impart stiffness thereto, and a connecting portion extending from an edge of each of said spring and presser bar portions to connect the same at a point intermediate the ends thereof, said connecting portion being integral with said spring and presser bar portions and substantially perpendicular thereto.

10. A presser bar and spring assembly for fountain pens of the like including an elongated spring portion, a pair of presser bar portions on each side of said spring portion, said presser bar portions having a generally angular cross section to impart stiffness thereto, and a portion connecting the mid-sections of each of said presser bar portions with said spring portion, said connecting portion being integral with said spring and presser bar portions.

11. A presser bar and spring assembly for fountain pens or the like including an elongated spring portion, a pair of presser bar portions on each side of said spring portion, said presser bar portions having a generally angular cross section to impart stiffness thereto, a portion connecting the mid-sections of each of said presser bar portions with said spring portion, said connecting portion being integral with said spring and presser bar portions, a pair of shoulders at the upper end of said spring portion, and a narrow tongue extending from said shoulders.

12. In a fountain pen including a barrel, a col-

lapsible sac within said barrel, a presser bar and spring assembly within said barrel including an elongated spring portion, a presser bar portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and spring portion intermediate the ends of the spring portion, said connecting portion being integral with said spring and presser bar portions, and means cooperating with said elongated spring portion and operable to bend said spring to move said presser bar portion against said sac to compress the same.

13. In a fountain pen including a barrel, a collapsible sac within said barrel, a presser bar and spring assembly within said barrel including an elongated spring portion having an offset section at its upper end, a presser bar portion, means to impart stiffness to said presser bar portion, and a portion connecting said presser bar and spring portions intermediate the ends of the spring portion, said connecting portion being integral with said spring and presser bar portions, and means mounted for reciprocating movement at the upper end of the barrel and cooperating with the offset section of said spring portion to compress the same and bend the spring portion to move said presser bar portion against the sac to compress the same.

14. The method of providing a fountain pen presser bar and spring assembly comprising cutting from a blank of soft steel a presser bar portion, a spring portion and a connecting portion integral therewith, stiffening said presser bar portion whereby the presser bar becomes relatively non-resilient, bending said blank at the integral connection between said presser bar and spring portion, and hardening and tempering said soft steel blank.

15. The method of providing a fountain pen presser bar and spring assembly comprising cutting from a blank of soft steel a presser bar portion, a spring portion and a connecting portion integral therewith, stamping a stiffening rib in said presser bar portion whereby the presser bar becomes relatively non-resilient, bending said blank at the integral connection between said presser bar and spring portion, and hardening and tempering said soft steel blank.

16. The method of providing a fountain pen presser bar and spring assembly comprising cutting from a blank of soft steel a presser bar portion, a spring portion and a connecting portion integral therewith, simultaneously stiffening said presser bar portion whereby the presser bar becomes relatively non-resilient, bending said blank at the integral connection between said presser bar and spring portion, and hardening and tempering said soft steel blank.

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