

Sept. 17, 1968

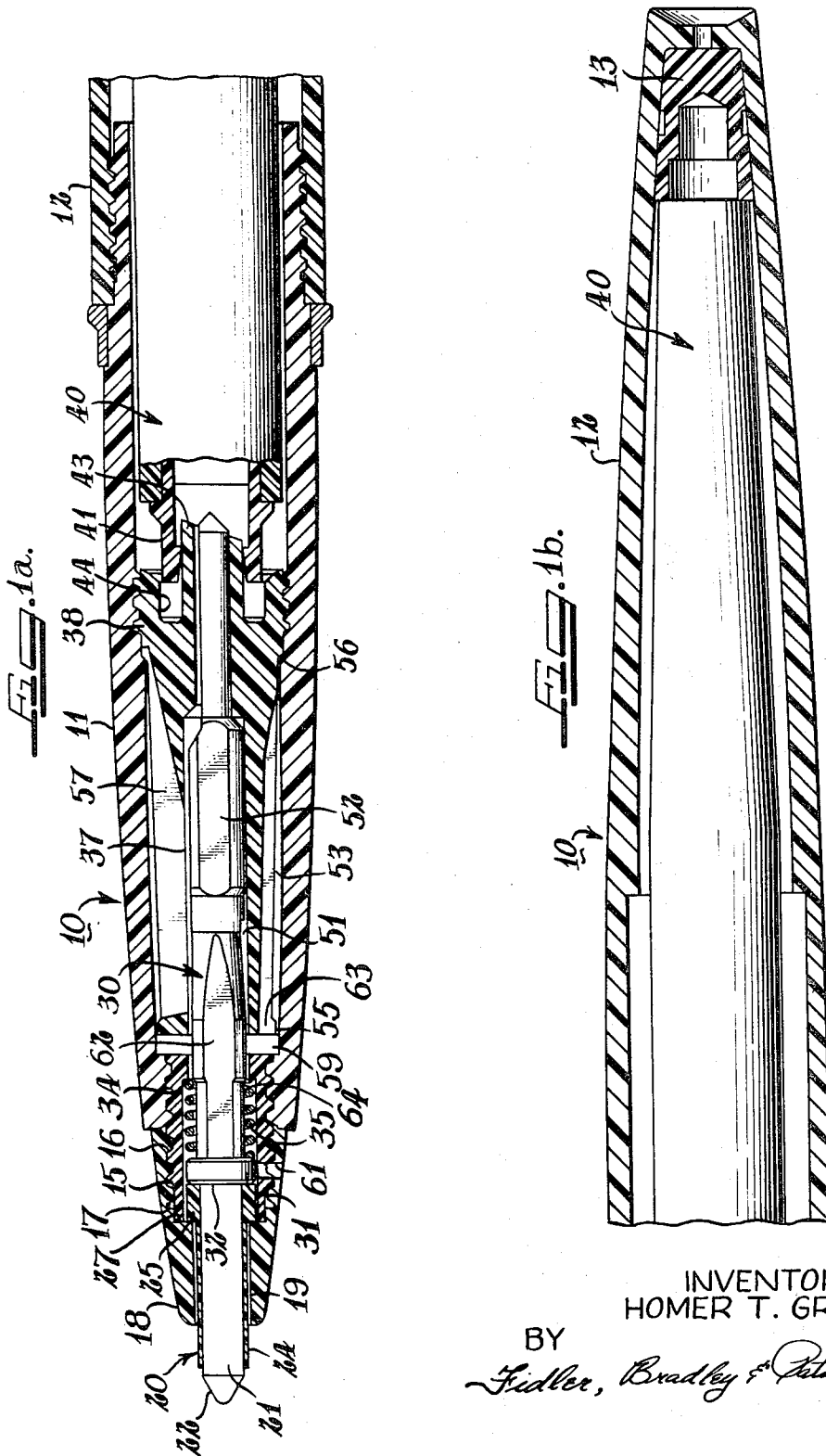
H. T. GREEN

3,402,008

WRITING INSTRUMENT

Filed Dec. 18, 1964

2 Sheets-Sheet 1



INVENTOR
HOMER T. GREEN

BY

Fidler, Bradley & Patenaude

Attys.

Sept. 17, 1968

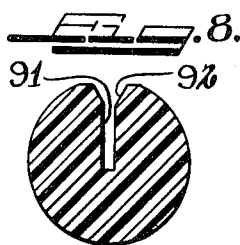
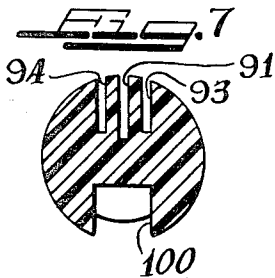
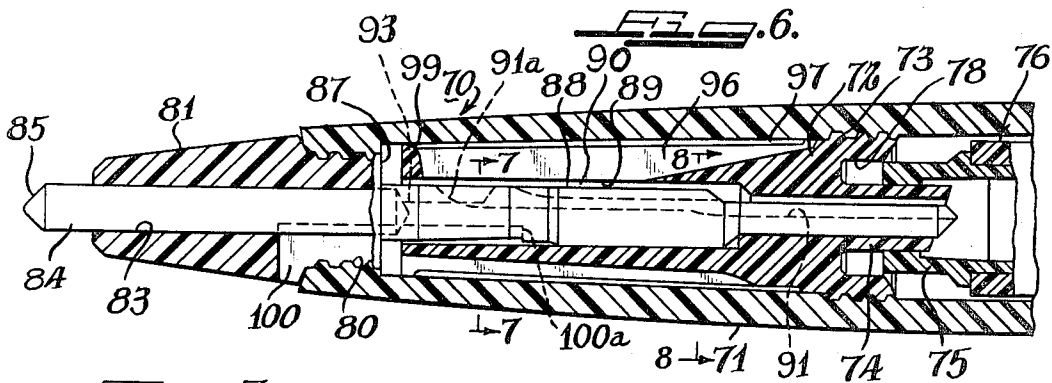
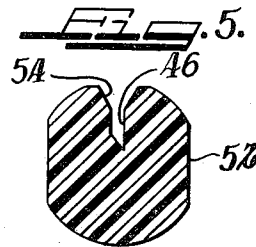
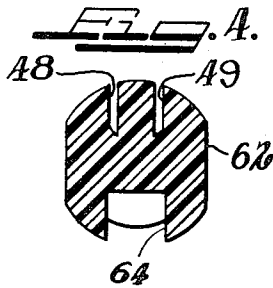
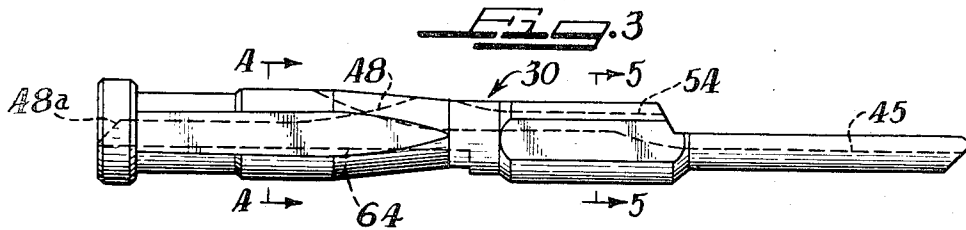
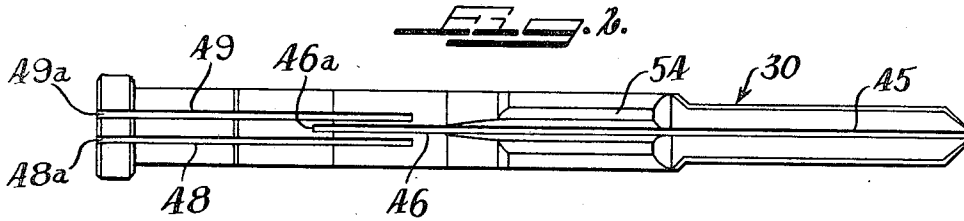
H. T. GREEN

3,402,008

WRITING INSTRUMENT

Filed Dec. 18, 1964

2 Sheets-Sheet 2



INVENTOR
HOMER T. GREEN

BY

Fidler, Bradley & Peterson
Attys.

1

3,402,008

WRITING INSTRUMENT

Homer T. Green, Milton, Wis., assignor to The Parker Pen Company, Janesville, Wis., a corporation of Wisconsin

Filed Dec. 18, 1964, Ser. No. 419,463

5 Claims. (Cl. 401-199)

The present invention relates to writing instruments, and it relates more particularly to a new and improved fountain pen employing a wick type writing nib.

Writing pens using wick type nibs have been known in the prior art for many years and have been sold commercially for applications where large width traces are satisfactory and where the squeal or squeak noise which is generated as the wick is drawn across the writing surface can be tolerated. In the past, such wicks have ordinarily been made of a felt-like or textile material having a multiplicity of interconnected capillary passages for holding a supply of liquid ink and for feeding the ink from a reservoir to the writing surface of the wick. More recently, writing wicks have been constructed of plastic materials which retain their shape better than do the felt or textile nibs. One such wick is disclosed in a copending application filed by Robert C. Shuman on Nov. 23, 1964, Ser. No. 413,145, and assigned to the same assignee as is the present invention.

With the advent of plastic writing wicks, finer lines or ink traces could be drawn with a wick type pen thus increasing the applications for which wick type writing instruments are suitable. Such pens have not, however, provided the precise control of the ink flow which is characteristic of the better fountain pens and ball point pens. Consequently, even the plastic wick types of writing instruments have not compared favorably with fountain pens and ball point pens for normal writing purposes. However, the wick type of writing nib has certain characteristics making it advantageous for several different writing applications. It would be desirable, therefore, to provide a wick type writing instrument incorporating means for precisely controlling the flow of ink to and from the writing wick as a trace is drawn across a writing medium. Moreover, it would be desirable to provide a wick type writing instrument using different sizes and styles of wicks so that the wick can be readily replaced with a wick having a different size or shape without the user being required to grasp the wick itself and thus smear his fingers with ink. Also, it would be desirable to provide a wick type of pen in which the ink supply can be quickly changed to permit the use of the same pen for different colors and types of ink.

Therefore, a principal object of the present invention is to provide a new and improved writing instrument employing a wick type writing nib.

Another object of the present invention is to provide a new and improved feed control system for a writing instrument employing a wick type nib.

A further object of the present invention is to provide a new and improved writing instrument having a readily replaceable wick type writing nib.

Briefly, the above and further objects are achieved in accordance with the present invention by providing a fountain pen type of ink feed control system for a plastic wick writing nib. In one embodiment of this invention, a feed bar is provided having capillary grooves extending longitudinally thereof for feeding ink from the reservoir to the nib, an overflow or collector chamber disposed between the reservoir and the wick nib and a weir provided for feeding replacement air to the reservoir. In this embodiment of the invention, the writing wick is supported in a removable collar near the forward end of the writing nib to facilitate replacement thereof.

2

In a further embodiment of the present invention the feed bar is slidably mounted within a collector plug and is reciprocable against a spring to clean the feed system of any ink particles which may become trapped therein during prolonged periods of non-use.

Further objects and advantages and a better understanding of the present invention may be had by reference to the following detailed description taken in connection with the accompanying drawings wherein:

FIGURE 1A is a longitudinally sectioned view of the forward portion of a writing instrument embodying the present invention;

FIGURE 1B is a longitudinally sectioned view of the rear portion of the writing instrument shown in FIG. 1A;

FIGURE 2 is a plan view of the feed bar used in the writing instrument of FIGS. 1A and 1B;

FIGURE 3 is a side elevational view of the feed bar of FIG. 2;

FIGURE 4 is a cross-sectional view taken along line 4-4 of FIG. 3;

FIGURE 5 is a cross-sectional view taken along the line 5-5 of FIG. 3;

FIGURE 6 is a longitudinally sectioned view of the forward portion of a writing instrument embodying another feature of the present invention;

FIGURE 7 is a cross-sectional view taken along the line 7-7 of FIG. 6; and

FIGURE 8 is a cross-sectional view taken along the line 8-8 of FIG. 6.

Referring now to the drawings and more particularly to FIGS. 1A and 1B thereof, there is shown a writing instrument 10 comprising a tubular collector shell portion 11 to the rearward end of which is threadedly attached a tubular barrel portion 12 closed at its rearward end by an imperforate tasse member 13. Threadedly received in the forward end of the shell 11 is an externally threaded connector sleeve 15 which is also threadedly received in a rearwardly facing counterbore 17 of a nib collar 18. The collar 18 includes a cylindrical bore 19 in which a nib assembly 20 is slidably disposed.

The nib assembly 20 includes a cylindrical wick 21 which, in the illustrated embodiment of the invention, has a generally conical writing nib forward end portion 22. The wick 21 is tightly fitted in a generally tubular nib holder 24 having an external flange 25 at the rearward end thereof for engagement with the rearwardly facing shoulder of the counterbore 17 in the nib collar 18. As shown, the bore 19 in the nib collar 18 has a diameter which is substantially larger than the external diameter of the nib holder 24. The spacing between the nib holder 24 and the bore 19 is preferably greater than capillary so that ink cannot feed therealong to the forward end of the nib collar 18. If such an ink feeding were to occur, the user of the pen might smudge or smear his fingers with ink. In this same respect, it will be noted that the nib holder 24 extends a substantial distance forwardly of the front end of the nib collar 18 and thus provides a shield or finger guard for the sides of the wick 21 which extend forwardly of the nib collar.

In order to feed ink from the reservoir to the nib, there is provided an ink feed bar 30, which is preferably molded of a suitable plastic, and has an integrally molded collar 31 which at its extremities abuts against the rear face of the nib holder 24 and engages the rearward face of the wick 21 throughout a large central area. To insure a tight capillary fit between the feed grooves in the bar 30 and the wick 21, the forward face 32 of the feed bar 30 is planar and conforms to the coplanar rearward faces of the wick 21 and the wick holder 24. The connector 15 includes a forwardly facing internally disposed, annular shoulder 34 providing a rear seat for a coil spring 35 which is slightly compressed between the

shoulder 34 and the rearward annular face of the collar 31 on the feed bar 30. The spring 35 thus maintains the feed bar 30 in physical engagement with the nib assembly 20.

The feed bar 30 extends rearwardly of the connector 15 through a generally cylindrical bore 37 in a collector plug 38 into the forward end of an ink reservoir 40. The reservoir 40 is of the replaceable or throw-away cartridge type and includes a forward collar portion 41 which sealably fits over a rearwardly extending tubular portion 43 on the collector plug 38. As shown, a recess 44 surrounds the tubular portion 43 for receiving the forward end of the cartridge collar 41. The cartridge 40 is closed except for the forward end portion and contains a quantity of liquid ink.

In order to convey ink from the cartridge 40 to the wick 21, a capillary feed groove 45, best shown in FIGS. 2 and 3, extends from the rearward end of the feed bar 30 to a location within the collector plug 38 near the rearward end thereof. A second capillary groove 46 extends from the forward end of the groove 45 to a location 46a within the collector plug 38 near the forward end thereof. The grooves 45 and 46 both have a V-shaped bottom to provide a substantially infinite capillary so that the feed grooves 45 and 46 contain ink as long as any ink is contained within the cartridge 40. The groove 46, additionally, has an enlarged upper portion 54 along its rearmost extent, providing a weaker capillary to and through which air will preferentially flow back into the reservoir to replace ink that leaves the reservoir.

Another pair of feed grooves 48 and 49 also having V-shaped bottom surfaces are of capillary dimension and extend rearwardly in mutual parallel relationship from the forward end of the feed bar 30. The feed grooves 48 and 49 overlap the forwardly extending portion of the feed groove 46 and are connected with one another and with the feed groove 46 by means of an annular weir chamber 51 defined by the feed bar 30 and by the inner cylindrical wall of the collector plug 38. The forward portions 48a and 49a of the feed grooves 48 and 49 are relatively deep whereby a large capillary area at the front end of the feed bar 30 lies closely adjacent to the rear face of the wick. Accordingly, a substantial ink flow to the wick can be provided.

The annular weir chamber 51 is of capillary dimension but by virtue of its size is of a sufficiently weak capillary so that replacement air may bubble back there-through into the enlarged portion 54 of the groove 46, from whence the air passes along the top of the rearward portion of the feed bar 30 into the cartridge 40.

In order to provide a collector chamber for holding a supply of ink when an overflow condition occurs whereby ink will not be forced out of the forward end of the pen 10, an annular collector chamber 53 is disposed between the cylindrical inner wall of the collector shell 11 and the portion of the collector shell 38 between an outwardly extending annular flange 55 provided at the front end of the plug 38 and a rearwardly disposed annular shoulder 56 which abuts a rearwardly facing annular shoulder on the shell 11. A longitudinally extending capillary feed slot 57 is dimensioned to provide a lesser capillary than the weir chamber 51 and is provided in the plug 38 to connect the weir chamber 51 with the overflow chamber 53.

A relatively large annular space 59 surrounds the feed bar 30 just forward of the collector plug 38 and is sufficiently large in size that it does not normally contain any ink and thus is an air space.

In order to obtain replacement air for the cartridge 40, a radial hole 61 extends through both the nib collar 18 and the connector sleeve 15 in alignment with a relatively large noncapillary air passageway 64 provided in the lower side of the feed bar 30 and extending longitudinally from the front end thereof back adjacent to the weir 51. Air thus passes rearwardly from the hole 61 through

the large longitudinally extending passageway 64 and into the weir chamber 51. The passageway 64 is also connected through the space 50 to the collector chamber 53 through a large air slot 63. Atmospheric pressure is thus exerted on the ink in the collector chamber 53.

When the collector chamber 53 is devoid of ink, ink will be drawn out of the reservoir for writing, and replacement air may flow through the passageway 64 into the weir chamber 51 and rearwardly into the cartridge 40. Until such time as the collector chamber 53 is emptied of ink, ink is supplied to the writing wick 21 from the collector chamber 53.

An advantage of the pen of the present invention is that it can readily be disassembled for cleaning, for changing the writing nib, and for changing the ink which is being used. In order to change the writing nib, the collar 18 is merely unscrewed from the shell and the entire nib assembly 20 is then free to be removed and replaced with a similar assembly having, for example, a different nib. As noted hereinabove, it is unnecessary for the person making the change to actually touch the ink-soaked wick during this operation.

When the nib collar 18 and the nib assembly 20 have been removed, the feed bar 30 may be slipped out of the forward end of the instrument and the remaining portions of the ink control mechanism can be flushed out with a suitable solvent. In the case of aqueous ink, the solvent would, of course, be water.

Should it be desired to change the color of ink being used, the cartridge 40 can be replaced by removing the barrel 12 from the shell 11 and pulling the cartridge 40 off the tubular portion 43 of the collector plug 38. At this time, it is preferable to flush out the forward portions of the writing instrument by removing the nib collar and the nib assembly so that none of the previous ink will be contained therein to contaminate the new ink which is to be used. Thereafter, the pen is reassembled with the new cartridge in place and the instrument is ready for use.

There are some types of ink that have a high pigment concentration and tend to clog the feed grooves when the pen is idle for long periods of time. In most cases, the sediment in the feed grooves can be freed by merely reciprocating the nib assembly longitudinally of the pen body thereby sliding the feed bar back and forth so that the liquid ink surrounding the feed bar loosens the sediment in the grooves. If the feed grooves remain clogged after such an operation, then the nib assembly and the feed bar may be easily removed for flushing. To avoid leakage of ink, it is preferable to remove the cartridge before performing this disassembly and cleaning operation.

Referring now to FIGS. 6, 7, and 8, there is illustrated the forward portion of another writing instrument embodying the present invention. As there shown, a writing instrument 70 comprises a tubular collector shell 71 to the rear end of which (not visible in the drawings) is threadedly connected a tubular barrel such as the barrel 12 shown in FIG. 1B. A collector plug 72 is provided with external threads 73 at the rearward end portion which mate with internal threads in the shell 71. A rearwardly extending tubular portion 74 on the plug 72 sealably receives a collar 75 of an ink cartridge 76 of the type 40 shown in FIG. 1A. Surrounding the tubular portion 74 is an annular recess 78 into which the collar 75 may extend when the cartridge is fully inserted onto the tubular portion 74.

The forward end portion of the collector shell 71 is provided with an internal thread 80 which mates with an external thread on a nib collar and feed bar member 81. Preferably, the member 81 is an integral piece molded of a suitable plastic. The forward end of the nib collar 81 is provided with a cylindrical hole 83 which tightly receives a cylindrical plastic writing wick 84 having a pointed end portion 85 providing a writing nib. The nib collar 81 includes a rearwardly facing annular shoulder 87

5

which surrounds a rearwardly extending feed bar portion 88. The feed bar portion 88 extends through a longitudinal bore 89 in the collector plug 72 and protrudes beyond the rearward end of the tubular extension 74 on the plug 72 into the ink cartridge 76.

In order to feed ink from the cartridge 76 to the wick 84, the feed bar portion 88 is provided with a longitudinally extending capillary groove 91 having a flared upper end 92. The groove 91 continues to a location 91a near the forward end of the collector plug 72. A pair of feed grooves 93 and 94 extend forwardly from a location in overlapping relationship with the feed groove 91 and intersect with the cylindrical hole 83 throughout a substantial portion of the length of the hole 83. Accordingly, as ink flows forwardly through the feed grooves 93 and 94 there is a substantial area of contact between the grooves 93 and 94 and the wick 84. The wick 84 includes a plurality of interconnected passageways which have a capillary greater than the capillary of the feed grooves 93 and 94 whereby ink is drawn from the feed grooves 93 and 94 into the wick 84 until the wick 84 becomes filled with ink.

In order to prevent the flow of ink from the forward end of the writing nib when the pressure differential between the reservoir in the cartridge 76 and the atmosphere increases, there is provided in the pen of the present invention an overflow collector whereby ink flows from the feed grooves 91, 93, and 94 through a capillary feed slot 96 extending longitudinally of the plug 72 into an annular overflow chamber 97 which surrounds the collector plug 72 rearwardly of an external annular flange 99 thereof. The overflow collector portion of the pen 70 is similar to and operates in the same manner as the overflow collector in the pen 10 described hereinabove.

In order to supply replacement air to the cartridge 76, the nib collar and feed bar member 81 is provided with a slot 100 which extends from a location immediately forward of the front end of the collector shell 71 to a location 100a rearwardly of the overlapping portions of the feed grooves 91, 93, and 94. A weir chamber 90, which surrounds the feed bar 100a is similar to the weir chamber 51 described above in connection with FIG. 1a and is of capillary dimension. It has a sufficiently small capillary to permit air to bubble back therethrough into the flared-out upper portion 92 of the capillary groove 91, whereby air feeds through the slot 100 into the annular weir chamber 90 and thence back along the top of the feed bar via the flared-out groove portion 92 to the ink reservoir in the cartridge 76.

In the fountain pen 70, the wick 84 may be changed by pulling it out of the nib collar and replacing it with another nib. Also, no means is provided for cleaning the feed mechanism except by removing the same from the collector shell 71 by unscrewing the nib collar and feed bar 81. When, however, the nib collar and feed bar 81 is unscrewed and disassembled, it may be readily flushed out. Also, after the cartridge 76 has been removed, the other portions of the feed mechanism may be flushed out.

While the present invention has been described in connection with particular embodiments thereof, it will be understood that those skilled in the art may make many changes and modifications without departing from the teachings of the present invention. Therefore, in the appended claims it is intended to cover all such changes and modifications as come within the true spirit and scope of this invention.

I claim:

1. A fountain pen comprising,
 - a housing,
 - an ink reservoir disposed in said housing,
 - a writing nib having a plurality of capillary passageways therein mounted in one end of said housing,
 - a feed bar disposed in said housing and extending between said nib and said reservoir,

6

said feed bar having a capillary passageway connected from said reservoir to said nib,
said feed bar being mounted for reciprocation relative to said housing and said reservoir,

- 5 a tubular member surrounding said feed bar intermediate its ends and defining therewith a weir chamber of capillary of said weir chamber being less than the capillary of the portion of said feed passageway extending therethrough,
- 10 said tubular member defining a collector chamber and having a passageway therein interconnecting said weir chamber and said collector chamber, and means defining a passageway of greater than capillary dimension connected from the exterior of said housing to said weir chamber.

2. A wick fountain pen for use with a liquid ink, comprising,

- a tubular housing portion,
- a reservoir mounted in said housing for retaining a supply of ink,
- 20 a tubular collector plug mounted in and defining with the inner wall of said housing portion an overflow chamber,
- a feed bar and nib holding member slidably mounted in said plug and having at least one groove of capillary dimension extending forwardly from said reservoir,
- said feed bar having an intermediate portion into which said groove extends and which is of reduced cross-sectional size to define with the inner wall of said plug a weir chamber,
- said feed bar having a further groove extending forwardly from said weir chamber to a location in non-capillary communication with the outside of said pen, and
- 35 a writing nib including a plurality of capillary passageways mounted in the forward end of said feed bar and nib holding member in capillary communication with said weir chamber.

3. A wick type fountain pen for use with a liquid ink, comprising,

- a generally tubular housing portion,
- a reservoir mounted in said housing for retaining a supply of ink,
- 45 a tubular collector plug mounted in and defining with the inner wall of said housing portion a capillary overflow chamber,
- said plug having an elongated capillary slot connected between said overflow chamber and the space within said plug,
- a feed bar and nib holding member slidably mounted in said plug and having a first groove of capillary dimension extending forwardly from said reservoir,
- said feed bar having an intermediate portion into which said groove extends and which defines with the inner wall of said plug a weir chamber,
- said feed bar having a second groove extending forwardly from the location of said weir chamber to a location in non-capillary communication with the outside of said pen, and
- 60 a writing nib including a plurality of capillary passageways mounted in the forward end of said feed bar and nib holding member in capillary communication with said weir chamber.

- 65 4. A fountain pen for use with a liquid ink, comprising,
 - a generally tubular housing portion,
 - a reservoir in said housing for retaining a supply of ink,
 - a generally tubular collector plug mounted in said housing and defining therewith a capillary overflow chamber,
 - 70 a feed bar and nib holding member slidably mounted in said plug and having at least one groove of capillary dimension extending forwardly from said reservoir,

7

said feed bar having an intermediate portion into which said groove extends and which defines with the inner wall of said plug a weir chamber,

said feed bar having at least one further groove extending forwardly from said weir chamber to a location in non-capillary communication with the outside of said pen, and

a writing nib including a plurality of capillary passages mounted in the forward end of said feed bar and nib holding member in capillary communication with said weir chamber.

5. A wick type fountain pen for use with a liquid ink and including a generally tubular barrel having an ink reservoir mounted in the rear portion and an ink feed system mounted in the forward portion, the improvement comprising,

a tubular overflow collector mounted in the forward portion of said barrel and having a transverse opening extending therethrough,

a feed bar extending through said collector with the rearward end thereof positioned to be bathed by the ink in said reservoir,

said feed bar having a capillary ink channel extending along its length,

8

a writing wick removably mounted in the forward end of said barrel in engagement with said feed bar, said feed bar having a forwardly opening wick receiving recess into which said capillary ink channel opens, and

said wick being press-fitted into said recess into engagement with the marginal end of the channel defining portion of said feed bar, whereby said wick is connected by said capillary channel to the ink in said reservoir.

References Cited

UNITED STATES PATENTS

2,624,902	1/1953	Soldner	15—569
2,684,052	7/1954	Rickmeyer	120—50 X
2,958,085	11/1960	Matschkal	15—563
3,154,055	10/1964	Lawton	120—50
3,233,275	2/1966	Hanson et al.	15—563

FOREIGN PATENTS

941,439	11/1963	Great Britain.
413,764	7/1934	Great Britain.

ROBERT W. MICHELL, *Primary Examiner.*

U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,402,008

September 17, 1968

Homer T. Green

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 66, "forwrad" should read -- forward --.
Column 6, line 6, after "of" insert -- capillary dimension, the --;
line 16, "wick fountain" should read -- wick type fountain --.

Signed and sealed this 17th day of February 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents

[REDACTED]