Dec. 1, 1942. L. P. MARTIN 2,303,374

FOUNTAIN PEN

Filed Nov. 3, 1941

Fig. 2.

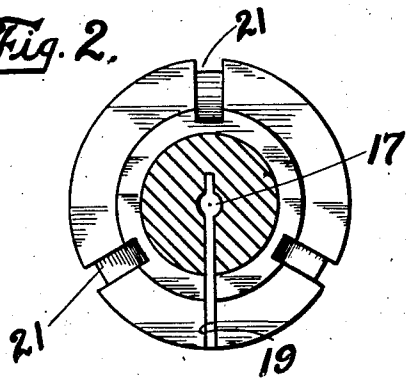


Fig. 4.

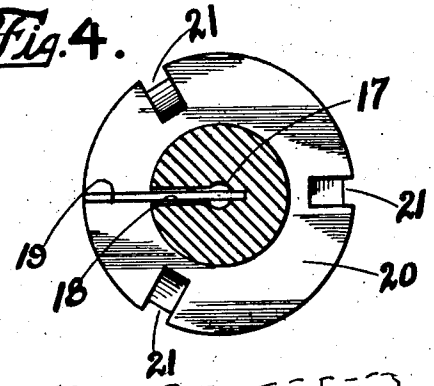


Fig. 1.

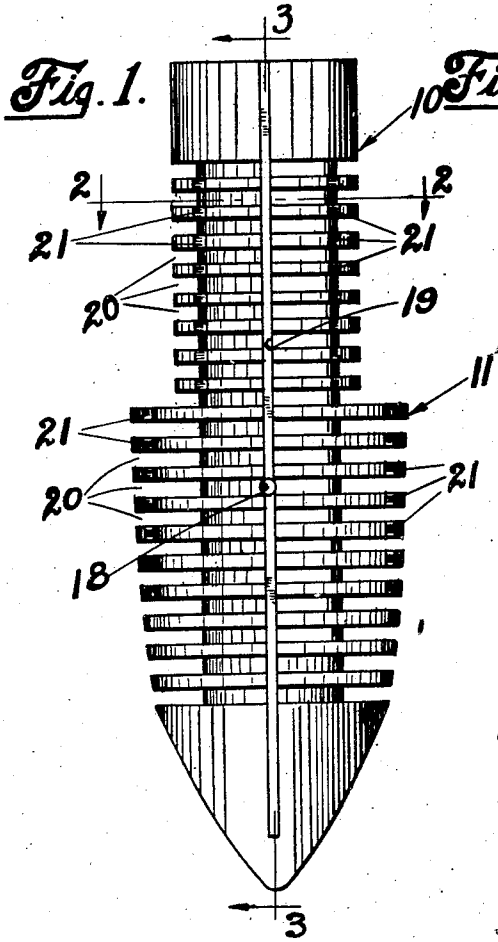
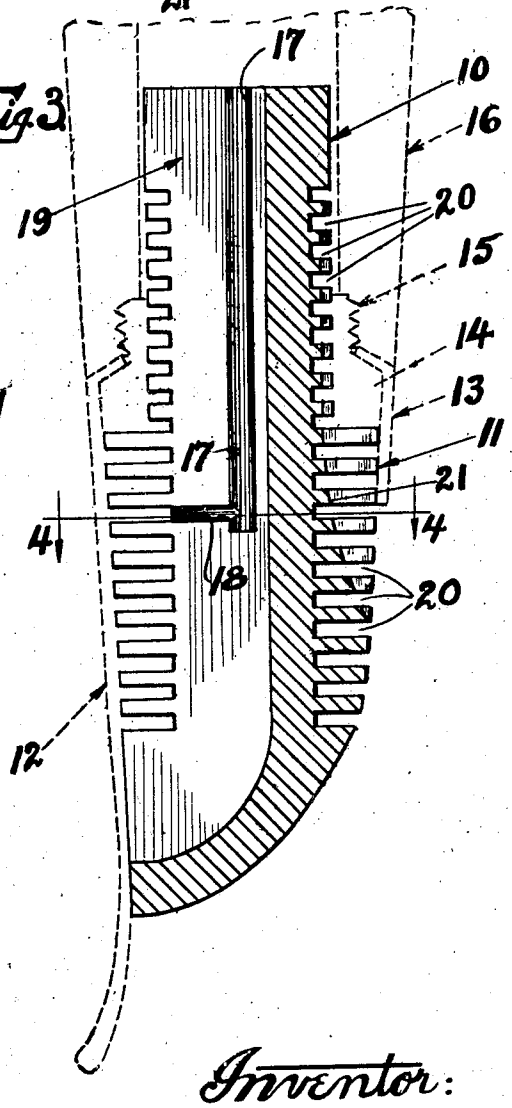


Fig. 3



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2,303,374

FOUNTAIN PEN

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Application November 3, 1941, Serial No. 417,667

15 Claims. (Cl. 120—50)

This invention relates to a fountain pen and has special reference to the feeding mechanism of a fountain pen for directing writing fluid from the reservoir thereof to the pen nib.

More particularly, this invention relates to a fountain pen including a feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of the fountain pen and a nib supporting portion extending beyond the end of the barrel, the nib supporting portion being of substantially greater diameter than the diameter of the shank portion. Means are provided in the feed bar for supplying writing fluid from the reservoir to the pen nib.

In the normal operation of a fountain pen, writing fluid is directed from a reservoir within the barrel thereof to the nib and therefrom onto a writing surface, air being directed into the reservoir to take the place of the writing fluid withdrawn therefrom. The air in the fluid reservoir of the barrel is effected by temperature and pressure changes, and the greater the amount of air in the reservoir and the lesser amount of writing fluid therein, the more difficult it is to control a normal supply of writing fluid to the writing surface.

Heat from the hand when the fountain pen is held in writing position tends to expand the air behind the writing fluid. Of recent years, it has been the tendency of fountain pen manufacturers to increase the fluid capacity of a fountain pen. A larger capacity pen, of course, has a larger amount of air to expand under comparable conditions. The larger fluid chamber, holding a comparatively greater amount of air when partially filled, tends to supply a greater amount of writing fluid to the writing surface than is necessary for ordinary writing, causing what is called a "flooding" of the pen, if the feeding mechanism is not capable of diverting a comparatively greater excess of fluid from the writing point.

The expansion of air behind the writing fluid within the reservoir may, for example, accompany a change of temperature conditions, such as is attained in holding the pen in writing position after the fountain pen has been maintained at a substantially lower temperature. Expansion also accompanies a change of atmospheric pressure, as when a fountain pen is carried by a passenger in an airplane. The present invention contemplates the elimination of flooding or leaking of the fountain pen by being capable of diverting fluid in excess of that which is necessary for normal writing into storage chambers, the amount of storage space being sufficient to accommodate considerably more than a normal expectant change in temperature and pressure conditions.

One of the objects of this invention is to provide a fountain pen having a feeding mechanism capable of diverting the excess amount of fluid not necessary for normal writing to storage chambers to eliminate flooding or leaking of the fountain pen.

Another object of this invention is to provide a fountain pen having a feeding mechanism which is simple and efficient in operation, is comparatively inexpensive to manufacture, and is durable.

Other objects and advantages of this invention will hereinafter be more particularly pointed out and for a more complete understanding of the characteristic features of this invention, reference may now be had to the following description and the accompanying drawing, in which latter:

Figure 1 is a front elevational view, greatly enlarged, of a feed bar embodying the features of this invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a central vertical sectional view taken on the line 3—3 of Fig. 1, a pen nib and pen section being fragmentarily shown in dotted lines; and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

Referring now more particularly to the drawing, the feed bar incorporating the features of the present invention comprises a shank portion 10 adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion 11 adapted to extend beyond the end of the barrel. The feed bar is for the purpose of directing writing fluid from the reservoir within the barrel of the fountain pen to a pen nib 12 shown in dotted lines in Fig. 3 of the drawing. The pen nib 12 in the present instance has a tubular shank portion 13 which embraces in a fixed relation a plug 14. The plug 14 has a head portion and a reduced threaded shank portion 15, the shank portion threadedly engaging the internally threaded portion of the bore at the end of the pen section or barrel 16.

The feed bar is provided with an internal duct 17 which extends longitudinally thereof from the reservoir end to a point intermediate the ends of the feed bar. A vent opening 18 extends transversely of the feed bar and preferably outside the end of the ba[illegible] 14, the vent opening

communicating with the internal duct 17. A longitudinally extending fissure 19 extends from the reservoir end of the feed bar to a point adjacent the other end thereof for supplying writing fluid from the reservoir to the nib 12. The fissure 19 is of capillary dimensions and extends preferably from the nib supporting surface of the feed bar transversely through and below the internal duct 17.

A plurality of comb cuts 20 extend transversely on the periphery of the feed bar and communicate with the fissure 19. In the instance of the structure shown in the drawing, the comb cuts extend entirely about the circumference of the feed bar, although, it is to be understood, that it may be desirable in instances of use for the comb cuts to extend but partially about the circumference of the feed bar on each side of the fissure 19. The comb cuts are preferably of greater width than the width of the fissure and extend over a major portion of the length of the feed bar including the shank portion 10 and the nib supporting portion 11. Thus the comb cuts extend outwardly from a point within the bore at the end of the barrel.

A plurality of cuts 21 extend longitudinally over a portion of the periphery of the feed bar for connecting a substantial number of the comb cuts and particularly those comb cuts disposed within the bore at the end of the barrel. The longitudinal cuts preferably connect all of the comb cuts within the bore of the end of the barrel and extend outside the end of the barrel to the atmosphere. In the drawing, three such longitudinal cuts have been shown, the longitudinal cuts being greater in width than the width of the comb cuts and being of lesser depth than the depth of the comb cuts.

The nib supporting portion of the feed bar is of substantially greater diameter than the diameter of the shank portion and preferably converges in a direction outwardly from the barrel end of the fountain pen. The depth of the comb cuts in both the shank and nib supporting portions of the feed bar terminate at substantially equal distances from the axis of the feed bar so that the actual capacity of the comb cuts of the nib supporting portion is substantially greater than the comb cuts of the shank portion. The enlarged head or nib supporting portion of the feed bar has the advantage, of course, of having a much greater capacity than were the shank and nib supporting portions of the same or substantially the same external diameter and of the same length.

In the normal writing action of the fountain pen employing a feed bar now in popular use, when diverting excess fluid not necessary for normal writing operation, the fluid is conducted from the reservoir through an internal duct to the fissure on the nib supporting periphery near the writing point end, the excess fluid being directed into comb cuts at the writing point end first and then progressively upwardly in the direction of the comb cut nearest the reservoir end of the feed bar. It has been found that the height to which fluid could be raised and released to comb cuts in this manner is materially limited and the capacity of the comb cuts within such height is insufficient for such abnormal conditions as should be accommodated.

The present invention determines that the height to which fluid may be maintained in the fissure and comb cuts of a feed bar when in writing position is greater than the height to which fluid can be raised and released by such a fissure into its communicating comb cuts.

Comb cuts 20 are disposed internally of the end of the bore of the fountain pen on the shank portion 10 of the feed bar and permit the storing of fluid in excess of that needed for writing in a greater amount than has been done previously, and the enlarged head or nib supporting portion of the feed bar stores fluid greatly in excess of that which has been done previously, the fissure 19 on the feed being connected with the fluid reservoir and communicating with comb cuts within the end of the bore of the barrel as well as with the comb cuts of substantially greater area on the nib supporting portion outside the end of the barrel.

The comb cuts nearest the reservoir are filled by writing fluid as the fluid is drawn by capillary attraction along the fissure 19 in the direction of the writing point and at the same time the comb cuts nearest the writing point end of the feed bar fill in a direction upwardly therefrom. In writing position, therefore, the comb cuts fill progressively inwardly from the ends thereof.

It has been found difficult to conduct writing fluid into and out of comb cuts on the periphery of the feed bar within the bore of the end of the barrel. Such difficulty has been overcome in the provision of the three longitudinally extending cuts 21 which are preferably spaced equi-distantly from each other and connect the comb cuts inside the bore of the barrel, the longitudinal cuts extending outside the bore of the barrel for communication with the atmosphere. By reason of the longitudinally extending cuts being made slightly less in depth than the comb cuts and slightly greater in width, the film strength of the fluid is weakened so that they are emptied by the cohesion of the fluid in them with the fluid in the long connecting fissure 19 on the top of the feed prior to the emptying of the comb cuts.

The longitudinal cuts, by reason of their dimensions, are the last to fill with excess fluid, so that all of the air previously contained in the comb cuts within the bore of the end of the barrel is forced thereout, prior to the time that the longitudinal cuts begin to fill.

The provision of longitudinally extending cuts and the provision of transversely extending comb cuts within the bore of the end of the barrel increases the capacity of the feed bar for diverting excess writing fluid from the nib. However, to further increase this capacity, the depth of the comb cuts is increased without weakening the structure of the feed bar. The central drilling 17 is provided with the fissure 19 passing from the periphery of the feed bar through and below the central drilling or so-called internal duct 17. The weakest fluid film is thus formed between the fissure and the central drilling or internal dust 17 somewhere between the lower end of the drilling and the reservoir end thereof, and in order to make all the fluid contract back into the fluid chamber, it has been found desirable to have this weakest fluid film formed near the front end of the center drilling.

The vent opening 18 is provided near the forward end of the internal duct 17 to connect the internal duct with the atmosphere and to locate the point of weakest film formation thereat. Thus, contraction from the front or writing point end is accomplished in a desirable manner and fluid which is in the comb cuts and longitudinal

cuts within the bore of the end of the barrel is drawn by capillary attraction out of the upper or back end of the fissure 19 where the fluid film is stronger than the film in the air vent, the air vent making the fissure purposely weak at the forward end of the internal duct 17. Fluid will be contracted back through the fissure at a point nearest the reservoir since the fluid film at that point will not break before the film at the air vent and the latter film will not break until the comb cuts adjacent the writing point have emptied. Thus it is assured that an expansion chamber free of fluid is formed capable of diverting excess fluid to its full capacity, should expansion occur after contraction.

In normal writing, when the expansion chambers—that is, the transverse comb cuts and the longitudinal cuts—are full, the comb cuts closest to the reservoir empty first. When the expansion chambers are empty, fluid leaves the fissure 19 at the writing point end and fluid taking the place of that leaving the fissure at the writing point end is directed from the reservoir in the bottom of the fissure 19 below the internal duct 17 in an unbroken condition and builds up in a direction from the writing point end toward the reservoir to control the air vent 18.

When contraction takes place due to cooling of the air in the reservoir or to a change in atmospheric pressure, if the expansion chambers are full and the pen is carried with the point directed upwardly, the comb cuts immediately adjacent the writing point end of the feed bar are relieved of fluid first and thereafter the comb cuts are relieved progressively toward the reservoir. Of course, if the expansion chambers are empty, such contraction will merely result in the intake of air. When a change in temperature or atmospheric pressure is had, resulting in expansion, if the expansion chambers are empty and the fountain pen is held in a normal writing position, the comb cuts are filled with writing fluid in excess of that needed for normal writing through the fissures above the central drilling to comb cuts nearest the reservoir and at the same time through fissure 19 below the internal duct 17 to the comb cuts farthest from the reservoir. This has been found to be normal, although this condition varies with a variance in the length of the feed bar and the rate of expansion.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof may be apparent to those skilled in the art without departing from the spirit and scope of this invention, and, therefore, the same is only to be limited by the scope of the prior art and the appended claims.

I claim:

1. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, and means for supplying writing fluid from said reservoir to said pen nib.

2. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion converging in a direction outwardly from the barrel end and being of substantially greater diameter than the diameter of said shank portion, and means for supplying writing fluid from said reservoir to said pen nib.

3. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, means for supplying writing fluid from said reservoir to said pen nib, and comb cuts extending transversely over at least a portion of the periphery of said feed bar in communication with said supply means.

4. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, means for supplying writing fluid from said reservoir to said pen nib, and comb cuts extending transversely over at least a portion of the periphery of both said shank and nib supporting portions of said feed bar.

5. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion converging in a direction outwardly from the barrel end and being of substantially greater diameter than the diameter of said shank portion, means for supplying writing fluid from said reservoir to said pen nib, and comb cuts extending transversely over at least a portion of the periphery of both shank and nib supporting portions of said feed bar.

6. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, means for supplying writing fluid from said reservoir to said pen nib, comb cuts extending transversely over at least a portion of the periphery of both shank and nib supporting portions of said feed bar, and longitudinally extending ducts disposed peripherally of said feed bar intersecting comb cuts within the bore at the end of the barrel.

7. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, means for supplying writing fluid from said reservoir to said pen nib, comb cuts extending transversely over at least a portion of the periphery of both shank and nib supporting portions of said feed bar, and longitudinally extending ducts disposed peripherally of said feed bar intersecting comb cuts of both said shank and nib supporting portions.

8. A feed bar having a shank portion adapted to be mounted within the bore of the barrel of a fountain pen and a nib supporting portion extending beyond the end of said barrel, said nib supporting portion converging in a direction outwardly from the barrel end and being of substantially greater diameter than the diameter of said shank portion, a peripherally disposed longitudinally extending fissure on said shank and nib supporting portions for supplying writing

fluid from said reservoir to said pen nib, comb cuts communicating with said fissure extending transversely over at least a portion of the periphery of both shank and nib supporting portions of said feed bar, and longitudinally extending ducts disposed peripherally of said feed bar intersecting comb cuts of both said shank and nib supporting portions.

9. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel to a point intermediate the ends thereof, and a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct.

10. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion converging in a direction outwardly from the barrel end and being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel to a point intermediate the ends thereof, and a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct.

11. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel to a point intermediate the ends thereof, a vent opening extending transversely of said feed bar and communicating with said internal duct, and a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct.

12. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel to a point intermediate the ends thereof, a vent opening extending transversely of said feed bar outside the end of said barrel and communicating with said internal duct, and a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct.

13. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel, a vent opening extending transversely of said feed bar and communicating with said internal duct, and a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said vent opening being greater in diameter than the width of said fissure and said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct.

14. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a wiring fluid reservoir in said barrel, a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct, and comb cuts extending transversely of said feed bar and being in communication with said fissure, said comb cuts being of greater width than the width of said fissure.

15. A feed bar having a shank portion adapted to be mounted within the bore at the end of the barrel of a fountain pen and a nib supporting portion extending beyond said end of the barrel, said nib supporting portion being of substantially greater diameter than the diameter of said shank portion, an internal duct extending longitudinally of said feed bar from one end thereof in communication with a writing fluid reservoir in said barrel, a longitudinally extending fissure of capillary dimensions in said feed bar extending from the reservoir end thereof to a point adjacent the other end thereof for supplying writing fluid to said nib, said fissure extending from the surface of said nib supporting portion transversely through and below said internal duct, and comb cuts extending transversely over at least a portion of said shank and nib supporting portions of said feed bar and being in communication with said fissure.

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