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WRITING INSTRUMENTS

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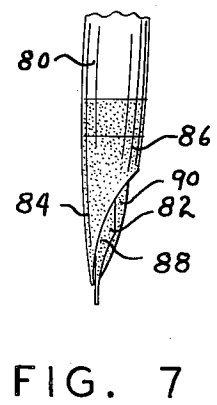
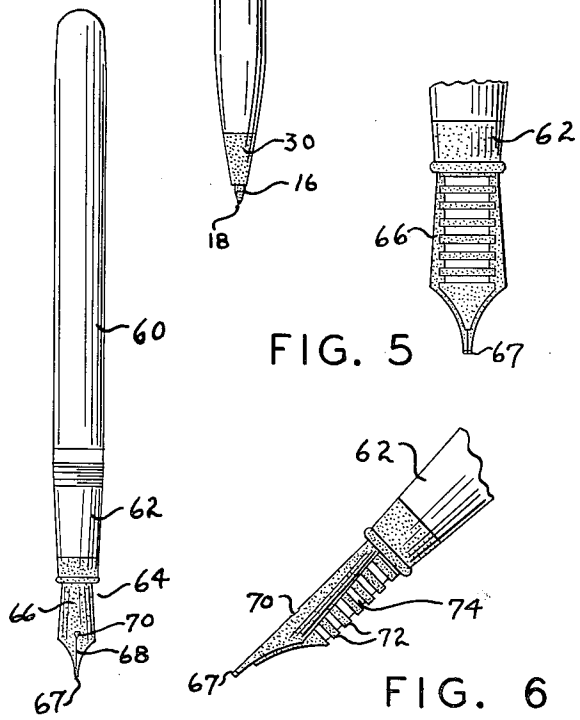
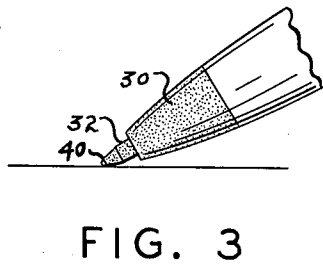
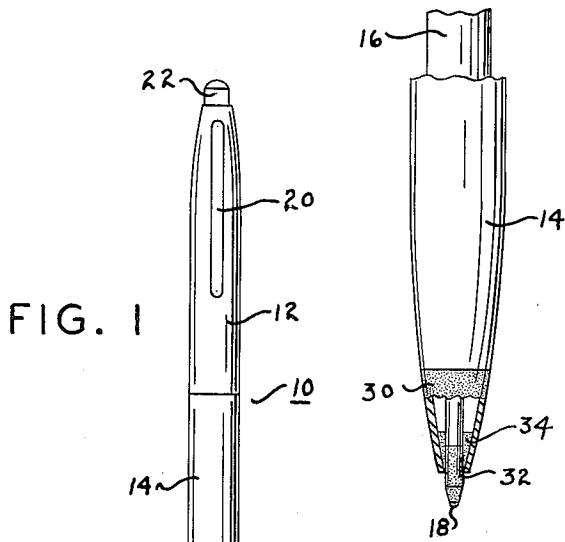


FIG. 4

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The present invention relates to writing instruments and more particularly to an improvement in fountain pens, ball point pens and the like.

In filling most conventional fountain pens the point or nib and often the lower part of the barrel are submerged in the ink, leaving a coating of ink on the grip or on the point adjacent the grip when the pen is withdrawn. Further, ink tends to creep upwardly along the point while the pen is in use or being carried in the pocket, occasionally, to or near the portion of the pen barrel gripped by the fingers, which thence become soiled when the pen is used. Creeping of the ink is also a problem with the ball point pens, the ink creeping away from the ball along the ink tube and barrel either while the pen is being used or while it is being carried. It is therefore one of the principal objects of the present invention to provide writing instruments using ink or other liquids, which confine the liquid to the writing tip and prevent it from creeping upwardly to the gripping portion of the barrel, and which tend to clean themselves of any ink coming in contact with certain selected portions of the pens.

Another object of the invention is to provide an instrument for writing, drawing or marking with liquid, which prevents the liquid from flowing or creeping away from the applicator part of the instrument.

Still another object of the invention is to provide a fountain pen the point of which can be submerged in the ink during filling without leaving a coating or film of ink on the exterior of the point above the tip or on the portion gripped by the fingers during writing.

A further object is to provide a ball point pen which concentrates the liquid on the ball and prevents spreading of the liquid along the side of the barrel and ink tube.

Another object of the invention is to provide a long wearing tip for ball point pens which will not smear the ink or soil the paper away from the line regardless of the angle at which the pen is held.

Additional objects and advantages will become apparent from the following description and the accompanying drawing, wherein:

Figure 1 is an elevational view of a ball point pen embodying my invention;

Figure 2 is an enlarged fragmentary view of the pen seen in Figure 1, showing the lower portion of the barrel in cross section;

Figure 3 is an enlarged fragmentary view of the pen shown in Figure 1, illustrating a position in which the pen is sometimes held during writing;

Figure 4 is an elevational view of a fountain pen having a conventional slit nib as shown embodying my invention;

Figure 5 is an enlarged fragmentary view of the pen seen in Figure 4, showing the underside of the nib;

Figure 6 is an enlarged fragmentary view of the pen shown in Figure 4, illustrating the position in which the pen is normally held during writing; and

Figure 7 is an enlarged view of the point end of a

different type of fountain pen than that shown in Figures 4, 5 and 6, in which the present invention is used.

Referring more specifically to the drawings, the ball point pen shown in Figure 1 consists of a barrel 10 having upper and lower sections 12 and 14, ink tube or cartridge 16 and ball tip 18. A clip 20 is attached to section 12 and a stem 22 for extending the ball point tip beyond the lower end of the barrel for writing and for withdrawing the tip into the barrel for carrying, projects above the upper end of the barrel. The details of the mechanism for extending and withdrawing the tip are not shown herein since the present invention does not involve that mechanism and is not concerned with any particular type of mechanism for accomplishing these operations.

The shaded areas 30 and 32 on the lower end of the barrel and ink tube indicate ink repellent coatings which confine the ink to the ball and prevent it from creeping upwardly along the side of the tube and onto the barrel.

The coating concentrates the ink at and on the ball so that a clear, distinct line is obtained and smearing and soiling of the paper away from the line is avoided. The ink repellent coating on the tube around the ball diminishes the tendency for the pen to leak since it eliminates the capillary action normally present in the conventional ball point pens. While the coating may cover the barrel above the point normally gripped by the fingers, it is usually preferable to confine the repellent coating to the barrel below this point in that the repellent coatings are somewhat slippery to the touch and do not facilitate a firm grip. As shown in Figure 2, an ink repellent coating 34 is preferably applied to the internal wall of the barrel as well as to the external wall to prevent ink from being deposited as the ink tube is being extended and withdrawn, thus preventing an accumulation of ink which may leak from the barrel while the pen is being carried in the pocket.

Various kinds of ink repellent coatings can be used, the principal requirement in addition to the ink repelling characteristic being their ability to adhere firmly to the surface of the pen parts so that they will not rub off during normal use and wear of the pen. While there are a number of different materials which will form satisfactory adherent coatings, and have no or substantially no capillary action, coatings of silicone resins are particularly suitable for the ink repellent material in most instances and are relatively easy to apply to the pen parts. The silicone material is applied as a solution to the surfaces of the barrel internally and externally, and on the ink tube as shown in Figures 1, 2 and 3. Care must be taken in applying the coating to avoid covering ball 18 or restricting any of the ink passages. This can be done by masking the portions to remain uncoated.

In applying an ink repellent coating to the ball end of the ink cartridge and barrel of a ball point pen, the areas to be coated are first cleaned with a suitable solvent such as isopropyl alcohol followed with an application of energine. The ball and other small adjacent sections which are to remain uncoated are preferably masked, in that removing the coating from these parts after the coating has been applied is normally a difficult operation. One example of a suitable procedure for applying an adherent ink repellent silicone coating consists in applying a first layer by dipping the areas to be coated in a solution of silicone resins, letting the layer dry for twenty minutes and then applying a second layer and letting it dry thoroughly. The coating can be applied either before or after the parts of the pen are assembled, although the coating is preferably applied before the parts are assembled since less difficulty is encountered in removing the coating from areas unintentionally coated. Further, silicone resin coatings, such as

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dimethyl silicone, requiring baking can be successfully applied when the parts are disassembled. Air drying silicone resin solution is usually necessary after the parts are assembled, particularly if the ink tube or cartridge contains ink. Ball point pens coated with silicone resin in the foregoing manner give better performance than similar pens not coated with the ink repellent, in that the coated portion remains free of ink, thereby being neater to use and carry.

Another suitable coating is tetrafluoro-ethylene (Teflon). The pen parts are coated with this material preferably while disassembled and then heated to a temperature of about 750 degrees F. for a time sufficient to set the resin coating. Before applying the coating, the portions to be coated are cleaned and the portions to remain uncoated are masked.

Some silicone coatings may require baking. Examples are dimethyl silicone and silicone rubber. Dimethyl silicone dissolved in carbon tetrachloride or other suitable solvent, or silicone rubber dissolved in toluene, gasoline or xylene is applied to the parts by dipping the parts in the solution or spraying the parts with the solution and the coated parts are then heated to set the resin.

Another ink repellent coating which can be used is trifluorochloro-ethylene. The foregoing materials are mentioned herein as examples of suitable ink repellent coatings; this is not to be construed as a limitation on the scope of the present invention.

In Figure 3 the pen is shown held at an angle such that the ball retainer 40 of the ink tube is in contact with the paper. This position is sometimes assumed during writing with the result that, with conventional ball point pens, the ink is smeared away from the line by the retainer portion so that the line appears ragged and non-uniform. The present ink repellent coatings, which cover the retainer and the ink tube thereabove, prevent the ink from creeping up on the retainer so that no smearing occurs when the pen is used in the position shown. The coating on the retainer also prevents wear of the metal retainer when it is being rubbed along the paper as the pen is used in the acute angle position and consequently increases the life of the ball tip.

A fountain pen is shown in Figures 4, 5 and 6 and, except for my ink repellent coating, may be considered conventional, including a barrel 60, section 62 and nib 64. In this example the coating 66 is placed on the exterior surface of the entire nib with the exception of the writing tip 67, and immediately adjacent channel 63 and heart 70. The peripheral surface areas 72 of feed 74 are also coated with the ink repellent. As seen in the Figures 4, 5 and 6 the coating is also applied to section 62 so that when the pen is dipped into the ink during filling, ink coming into contact with the portion of the pen gripped by the fingers during writing will be repelled and tend to drip from the section as the pen is withdrawn from the ink.

Another design of a fountain pen is shown in Figure 7 consisting of a barrel 80 and nib 82 partially enclosed by an extension 84 of the barrel, the ink repellent coating 86 being applied to the barrel, extension, point 88 and feed 90 as indicated by the shaded areas. In this design the nib including feed 90 is coated to the same extent as the one shown in Figures 4, 5 and 6, although it is not necessary to coat the point underlying extension 84.

The same ink repellent materials mentioned in connection with Figures 1, 2 and 3 are suitable for the repellent coating on the fountain pens and may be applied to the pens in the same manner as described above. It is necessary, however, to mask the point and the areas ad-

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acent the channels before the coating is applied or to remove the coating from those areas before the pens can be used.

Although only two illustrations of writing instruments having a liquid repellent coating are given herein, additional modifications and applications may be made without departing from the scope of the present invention.

I claim:

1. A ball point pen comprising a barrel, an ink tube in said barrel, a ball on the end of said tube, a means for retracting said ball into said barrel, an adherent coating of dimethyl silicone resin on the exterior of said tube adjacent said ball, an adherent coating of dimethyl silicone resin on the external surfaces of said barrel at the ball point end of the pen, and an adherent coating of dimethyl silicone resin on the internal surface of said barrel at the ball point of the pen.

2. A ball point pen comprising a barrel, an ink tube in said barrel containing ink, a ball on the end of said tube, an adherent coating of ink repellent material on the exterior of said tube adjacent said ball, and an adherent coating of ink repellent material on the external and internal surfaces of the ball point end of said barrel, said material being repellent to the ink in said tube.

3. A ball point pen comprising a barrel, an ink tube in said barrel containing ink, a ball on the end of said tube, an adherent coating of ink repellent material on the exterior of said tube adjacent said ball, and an adherent coating of ink repellent material on the external surfaces of the ball point end of said barrel, said material being repellent to the ink in said tube.

4. A ball point pen comprising a barrel, an ink tube in said barrel, a ball on the end of said tube, and a coating of dimethyl silicone material on the exterior of said tube adjacent said ball.

5. A ball point pen comprising a barrel, an ink tube in said barrel, a ball on the end of said tube, and a coating of dimethyl silicone material on the external surface of the ball point end of said barrel.

6. A ball point writing instrument cartridge comprising an ink tube containing ink, a writing ball at one end of said tube, and an ink repellent material on the exterior of said tube adjacent said ball, said material being repellent to the ink in said tube, wherein said material is dimethyl-silicone resin.

7. A ball point writing instrument cartridge comprising an ink tube containing ink, a writing ball at one end of said tube, and an ink repellent material on the exterior of said tube adjacent said ball, said material being repellent to the ink in said tube, wherein said material is silicone rubber.

8. A ball point writing instrument cartridge comprising an ink tube containing ink, a writing ball at one end of said tube, and an ink repellent material on the exterior of said tube adjacent said ball, said material being repellent to the ink in said tube, wherein said material is tetrafluoro-ethylene.

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