April 24, 1962 J. J. DYSON 3,030,925

WRITING INSTRUMENTS

Filed June 17, 1957

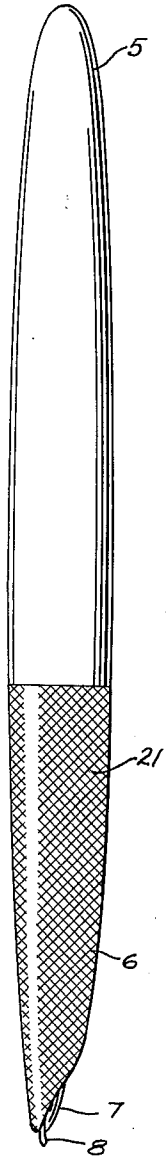


FIG. 1

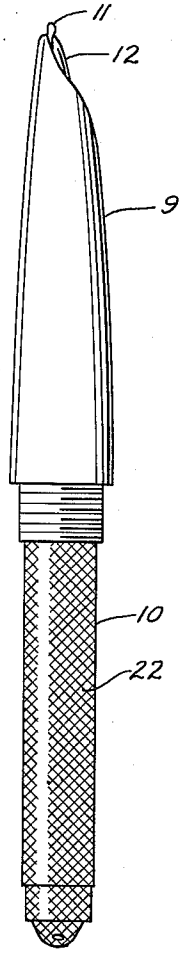


FIG. 2

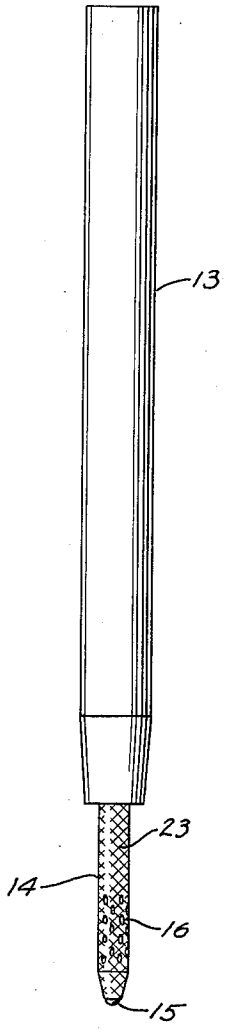


FIG. 3

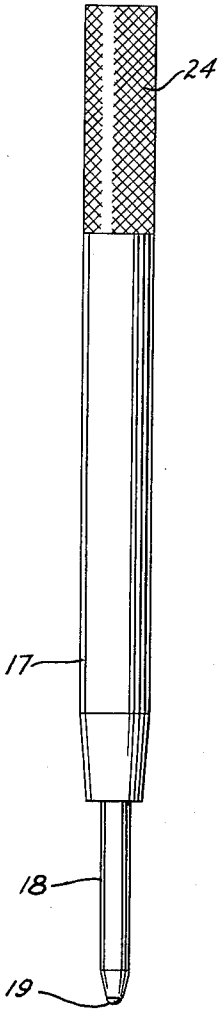


FIG. 4

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United States Patent Office 3,030,925 Patented Apr. 24, 1962

3,030,925

WRITING INSTRUMENTS

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Filed June 17, 1957, Ser. No. 666,121
17 Claims. (Cl. 120—42)

This invention relates in general to writing instruments and in particular to writing instruments fillable and refillable with ink such as certain fountain pens and desk pens of the nib type and ball point type.

In filling such writing instruments with ink, a portion of the instrument is submerged in ink, and some of the ink adheres to this portion. This necessitates wiping off or otherwise cleaning that portion in order to avoid the messiness which would otherwise result.

It is therefore an object of this invention to provide a writing instrument wherein the portion of the instrument which is dipped in ink has an ink shedding surface which repels the ink therefrom so as to be self cleaning upon withdrawal from the ink thereby eliminating any subsequent wiping off or cleaning operation.

Additional objects and advantages will appear from the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an elevational view of a nib point fountain pen of the front end filling type embodying the invention;

FIG. 2 is an elevational view of a nib point fountain pen of the rear end filling type embodying the invention;

FIG. 3 is an elevational view of a ball point fountain pen unit of the front end filling type embodying the invention; and

FIG. 4 is an elevational view of a ball point fountain pen unit of the rear end filling type embodying the invention.

Referring to the drawings, there is shown in FIG. 1 a nib point fountain pen having a rear portion 5, a front portion 6, and a feed bar 7 and nib 8. The nib and the feed bar are substantially covered by the front portion 6. This fountain pen is filled with ink by any suitable filling mechanism (not shown) while immersing the front end of the fountain pen in ink. The filling mechanism may be any of the well-known positive displacement mechanical manually manipulated filling mechanisms such as the pumping type with reciprocal plungers or the squeezer type with transversely squeezable reservoir sacs. The filling mechanism may, if desired, be that of the capillary type wherein the rear end portion 5 has therein a capillary structure which is connected to the feed bar 7 and nib 8 so that upon immersion of the front end portion 6 in the ink, the ink is drawn into the reservoir within rear end portion 5 by capillarity without any manual manipulation.

In order to eliminate the necessity of wiping off or otherwise manually cleaning that part of front portion 6 which is dipped in the ink, the front portion 6 is provided with an ink shedding or ink repellent surface 21 which is shown double-hatched to indicate this surface. When the front portion 6 of the fountain pen is removed from the ink, the surface 21 repels or sheds ink therefrom so that the surface of the front portion 6 remains clean and free of ink. The ink shedding surface 21 may be provided by coating the front portion 6 with a material having ink shedding or ink repellent properties, or by making the front portion 6 from a material having ink shedding or ink repellent properties. Materials which may be effectively used to practice this invention are discussed hereinafter.

In FIG. 2 there is shown a nib point fountain pen of the rear end filling type. A front portion 9 substantially covers the feed bar 12 and nib 11 of the fountain pen,

and a rear portion 10 is dipped in or submerged in ink to fill the fountain pen. Any suitable filling means (not shown) may be used; preferably a capillary structure within the rear end portion 10 so that the ink is drawn thereinto by capillarity without any manual manipulation. In order to maintain the rear end portion 10 clean and dry and free of ink, an ink shedding surface 22 is provided for rear end portion 10. This may be a coating thereon of an ink shedding material or, if desired, the rear portion 10 may be made of an ink shedding material.

FIG. 3 discloses a ball point fountain pen unit having a rear reservoir portion 13 and a forward feed portion 14 which houses at its forward end a writing ball 15. In the feed portion or tube 14, between the ball 15 and the rear portion 13, there are provided filling openings 16 so that, upon immersion of portion 14 in ink, the reservoir inside of rear portion 13 may be filled. The filling mechanism may be of any suitable type, such as a capillary structure within rear portion 13, or the rear portion 13 may be flexible so that the pen is filled by the positive displacement method of manually squeezing the portion 13. In order to keep portion 14 clean and dry and free of ink, there is provided for portion 14 an ink shedding surface 23. Surface 23 may be provided by coating portion 14 with an ink shedding material or by making portion 14 from an ink shedding material.

In FIG. 4 there is shown a ball point fountain pen unit comprising a rear or reservoir portion 17 and a forward or feed portion 18 which houses the writing ball 19. This unit is of the rear end filling type wherein the unit is filled with ink by immersing the rear end of portion 17 in ink. The filling mechanism may be of any suitable type, preferably capillary wherein the reservoir 17 has therein a capillary structure which draws the ink thereinto by capillarity merely upon immersing the rear end of portion 17 in the ink. To maintain the rear portion of reservoir 17 clean and dry and free of ink, the surface thereof is an ink shedding surface 24. The ink shedding surface may be obtained by coating the portion 17 with, or by making the portion 17 of, an ink shedding material.

The ink shedding materials referred to above may be selected from a variety of such materials now available which have the desired property.

Fluoropolymers are excellent materials for this purpose.

An excellent fluoropolymer material for this purpose is polytetrafluoroethylene. This material is sold by E. I. du Pont de Nemours, Inc. under the trade name of "Teflon." The portion in question, if coated, is first coated with this material, e.g. by coating with a water dispersion of this material, and then heated to set the coating. If desired, the portion in question may be made ink shedding by being made entirely of this material.

Another highly satisfactory fluoropolymer material is polytrifluoromonochloroethylene. This material has been sold by the M. W. Kellogg Company and is now sold by the Minnesota Mining and Manufacturing Company under the tradename "Kel-F." The portion to be made ink shedding may be coated with this material in the maner described above or may be made entirely of this material.

Another way to obtain an ink shedding coating on the portion in question is to react a stearic acid compound with a silicagel or "estersil," the reaction resulting in an ink shedding material which can be coated on the portion. The abovementioned Du Pont company sells such an "estersil" under the trade name of "Valron estersil." An "estersil" is a surface esterified amorphous silica.

Another way of obtaining an ink shedding surface on the portion in question is to provide water on the surface

of the portion (or simply rely on the water normally thereon) and then apply a chlorosilane. The chlorosilane racts with the water and results in an ink shedding coating on the surface. Such chlorosilanes are sold by the General Electric Company under the trade name of "Dri-Films." Dimethyldichlorosilane is one such material for accomplishing this result.

Still another way to obtain an ink shedding surface on the portion in question is to coat the portion with silicone dioxide by any suitable process such as vapor depositing of the silicone dioxide thereon and then treat the portion so coated with silanes. This results in an ink shedding coating. If desired, for further improving the shedability of the portion, the resulting coating may further be treated by reacting it with a stearic acid compound or an oleic acid compound.

Another approach to obtain an ink shedding surface on the portion in question is to react any of the so called Werner compounds ,Werner compounds are chrome complex materials) with the stearic acid or oleic acid compounds. An ink shedding surface results when the material so obtained is applied to the portion in question.

Ink shedding surfaces may be obtained by utilizing the silicone resin materials. A material sold by the Dow Corning Company under the name of "No. 200 Silicone Fluid," when applied to the portion and heated, forms a silicone resin (dimethyl silicone resin) coating.

Silicone elastomers are another group of materials which can be used, but somewhat less effectively, to obtain an ink shedding surface. Silicone elastomer, when dissolved in the usual solvents therefor, may be applied to the part in any convenient manner. The coated part may then be heated to set the coating.

The portion of the writing instrument which is immersed in ink may also be made ink shedding by either coating that portion with polyethylene or making that portion of polyethylene.

It is clear from this specification that this invention provides a novel writing instrument of the ink-fillable type having a portion thereof which is immersed in ink for filling, and having this portion provided with an ink shedding surface which is non-wettable by aqueous inks whereby this portion, when withdrawn from aqueous ink, is clean and dry and free of ink.

I claim:

1. A fountain pen comprising a housing having a writing point extending therefrom, an ink reservoir therein, and ink feed means therein connecting said reservoir and said point, said housing having a portion adjacent one end thereof immersible in ink, and means for filling said reservoir with ink through said one end when said portion is immersed in ink, the exterior side surfaces of said portion being permanently formed of a material repellent to aqueous ink.

2. The invention defined in claim 1 wherein said portion is the finger-gripping part of the fountain pen.

3. A fountain pen comprising a housing having a writing point extending therefrom, an ink reservoir therein, and ink feed means therein connecting said reservoir and said point, said housing having a portion adjacent one end thereof immersible in ink, and means for filling said reservoir with ink through said one end when said portion is immersed in ink, the exterior side surfaces of said portion being permanently coated with a material repellent to aqueous ink.

4. The invention defined in claim 3 wherein said material is a fluoropolymer.

5. The invention defined in claim 3 wherein said material is polytetrafluorethylene.

6. The invention defined in claim 3 wherein said material is polytrifluoromonochloroethylene.

7. The invention defined in claim 3 wherein said material is a silicone resin.

8. The invention defined in claim 3 wherein said material is the material resulting from a reaction of a Werner chrome complex compound with a stearic acid.

9. The invention defined in claim 3 wherein said material is the material resulting from the reaction of water and chlorosilane.

10. The invention defined in claim 3 wherein said material is the material resulting from the reaction of a silicagel with stearic acid.

11. The invention defined in claim 3 wherein said material is a silicone elastomer.

12. The invention defined in claim 3 wherein said material is polyethylene.

13. A fountain pen comprising a housing having a writing point extending therefrom, an ink reservoir therein, and ink feed means therein connecting said reservoir and said point, said housing having a portion adjacent one end thereof immersible in ink, and means for filling said reservoir with ink through said one end when said portion is immersed in ink, said portion being made entirely of a material repellent to aqueous ink.

14. The invention defined in claim 13 wherein said material is a fluoropolymer.

15. The invention defined in claim 13 wherein said material is polytetrafluorethylene.

16. The invention defined in claim 13 wherein said material is polytrifluoromonochloroethylene.

17. The pen defined in claim 1 wherein said one end is located at the end of said pen opposite to said point.

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