Feb. 6, 1940. A. E. ANDREWS ET AL 2,189,696

STYLOGRAPHIC PEN

Filed Dec. 13, 1938

FIG. 1.

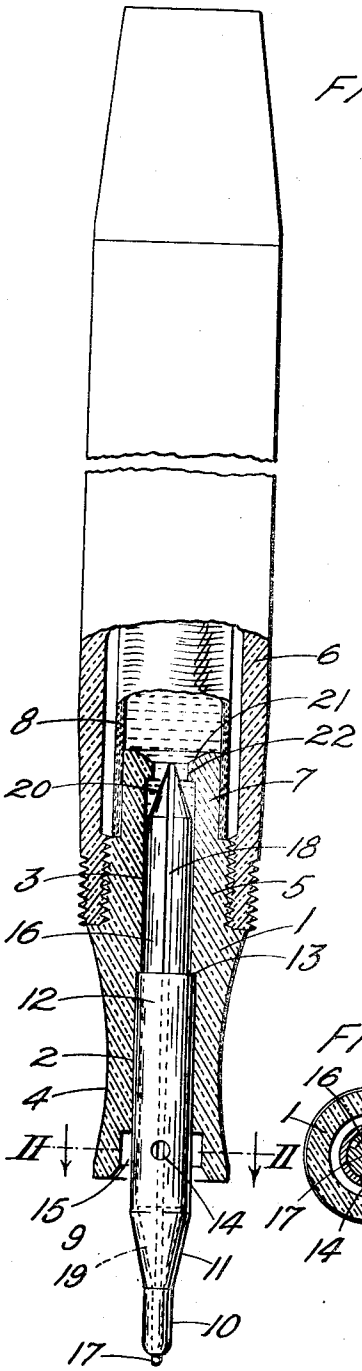


FIG. 2.

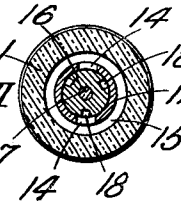
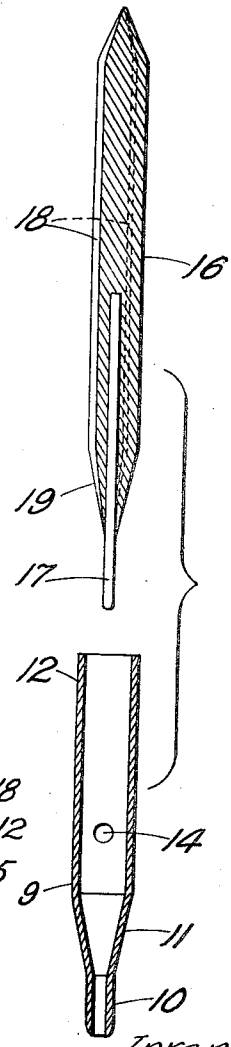


FIG. 3.



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STYLOGRAPHIC PEN

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8 Claims. (Cl. 120—44)

This invention relates to stylographic pens and is concerned more particularly, although not exclusively, with stylographic pens of the self-filling type.

In the majority of the stylographic pens heretofore known, the feed wire extending axially through the conical point section secured to the pen barrel is guided adjacent to its free end in a fine-bore tube of non-corrodible material, usually metal, which constitutes the writing point. This small tube is relatively short and is inserted in the nose of the point section of the pen which is usually of a material such as vulcanite. It requires great skill and care to fit the tube satisfactorily since, if it becomes loose or assumes an inclination relatively to the axis of the point section, the feed wire cannot move freely within the tube and the flow of ink to the point of the latter is impeded or disturbed. In addition, the point section is easily broken, so that the tube falls out and/or the pen becomes useless.

The feed wire itself is, in some cases, constantly urged outwardly by a spiral spring to which it has been formed at its inner end and is, in other cases, urged outwardly (downwardly) when the pen is in use by a weighted feed bar mounted within the point section and carrying the said feed wire.

Where self-filling pens are concerned it is necessary to provide air vents or the like in the point section to facilitate the filling of the pens and the provisions usually made are of a complicated nature requiring skilled labour and a number of different operations for their satisfactory application.

An important object of the present invention is to provide improvements in the construction of stylographic pens, particularly in the writing point and the parts associated therewith, which shall greatly simplify and cheapen the assembly and improve the efficiency of the pens.

According to one feature of this invention, therefore, a stylographic pen, particularly a self-filling stylographic pen, comprises a tubular point section having a relatively wide mouth, a tubular tip fixed in the said mouth and a fine-bore tube, which constitutes the writing point, formed with the said tip as one integral part of non-corrodible metal.

According to another feature of the invention, a stylographic pen comprises a writing point formed integrally with a tubular tip which is adapted to fit into and be frictionally retained in a bore in the point section of the pen, the said bore opening to the atmosphere at the free end of the point section and the tip being formed with an aperture or apertures affording communication between its interior and the said bore.

Yet a further feature of the invention is the use of a weighted feed bar carrying the usual feed wire and formed with longitudinal extending grooves. The feed bar is preferably a close, but not frictional, fit in the interior of the tip and may be prevented from falling into the ink reservoir by forming or providing the point section of the pen with stop means adapted to engage the end of the feed bar.

One manner in which the invention may be carried into effect will now be described by way of example and with reference to the accompanying drawing, in which:

Fig. 1 is a longitudinal section of the pen,

Fig. 2 a cross-section on line II—II in Fig. 1, and

Fig. 3 a longitudinal sectional view of the tubular tip and the feed bar withdrawn therefrom.

In the example illustrated, a tubular point section 1 is produced from a suitable material, such as a synthetic resin composition, to exhibit an axial bore 2, 3, an externally waisted or coned lower end 4 and an inwardly stepped upper end which may be externally screw-threaded for the first part 5 of its length to engage in the correspondingly threaded mouth of the pen barrel 6 and, in the illustrated case of a self-filling pen, may be smooth for the remaining part 7 of its length to receive the ink sac 8. The lower part 2 of the axial bore in the point section 1 is of slightly larger diameter than the upper part 3, such larger diameter persisting for, say, about ⅓ or ½ of the length of the bore.

A hollow thin-walled tubular tip 9 is formed in one piece, preferably by a drawing operation, from a non-corrodible metal which is most advantageously stainless steel, and exhibits a "point" 10 constituted by a small diameter fine-bore tube, an intermediate conical portion 11 and an upper cylindrical portion 12. The external diameter of the latter is such that it may fit tightly into and be frictionally held in the lower or wider part 2 of the bore in the point section 1, the shoulder 13 formed in the bore serving as a stop to limit the extent to which the tip 9 is introduced. The length of the cylindrical portion 12 of the tip is preferably such that, when engaged in the point section, at least the conical portion 11 projects beyond the said point section. One or more apertures 14 (two

are shown) are formed through the wall of the said cylindrical portion 12 at a location such that they will afford communication between the interior thereof and an annular space 15 formed around the exterior of the tip by a recess of larger diameter in the point section 1. Such communication is preferably established well within the annular space 15 and, if desired, at or adjacent to the inner end thereof. The outer end may be flared slightly as shown in Fig. 1.

Within the tip 9 is located a feed-bar 16 which is preferably of heavy construction and has the feed wire 17 directly secured therein. A preferred construction has a feed-bar 16 in the form of a cylindrical rod of lead with longitudinally extending grooves 18 which may, if desired, increase slightly in depth in the direction away from the feed wire 17. The rod is tapered somewhat at the end 19 where the axial feed wire is inserted, to conform to the internal shape of the conical portion 11 of the tip 9, and is preferably similarly tapered at the opposite end 20, the grooves extending over the tapered faces also (Figs. 1 and 3). The lead may be cast to shape and the wire may have its one end embedded therein during this operation. The diameter of the feed-bar 16 is slightly less than the internal diameter of the part 12 of the tip 9, so that it fits closely to the latter while being free to slide therein. The grooves 18 co-operate with the wall of the tip 9 to constitute capillary passages. With the pen held point downwards the feed wire 17 projects slightly through the "point" 10 of the point section (Fig. 1).

In order to prevent the feed-bar 16 from falling into the ink-reservoir 8 when the pen is held point upwards, the inner end 7 of the point section 1 is preferably formed with stop means extending part-way across the bore therein. Such stop means may be produced by arranging for the portion 3 in the point section to terminate just short of the inner end thereof and forming a conical depression 21 and aperture 22 in the outer end of the said section, the aperture 22 being of less diameter than the feed-bar 16. To improve the flow of ink the conical wall of the depression may be formed, if desired, with radial grooves or sawcuts (not shown) which divide the annular stop means into two or more sector-shaped parts.

In the assembly of the pen, the ink-sac 8 (when provided) is first engaged over the end 7 of the point section 1 which is then screwed into the barrel 6. The feed-bar 16 is inserted into the bore of the point section so that its end 20 rests on the stop means therein and the tip 9 is engaged over the projecting end of the feed-bar and forced into frictional engagement with the portion 2 of the bore in the point section.

In use, a slight writing pressure on the point of the feed wire 17 causes this to recede into the tubular "point" 10 of the tip and ink flows from the reservoir 8 through the capillary passages 18 to the writing point. The tapered ends 19, 20 of the feed-bar, and the fact that the grooves extend to the extremities of these, ensure that the ink will be picked up very readily from the ink-reservoir and conducted directly on to the feed wire 17, respectively. Easy flow of ink, without flooding, is ensured by slow entry of ink-replacing air to the reservoir through the narrow annular space 15, the aperture 14 in the tip 9 and one or more of the grooves 18 in the feed-bar. When the pen is of the self-filling type, filling is effected by immersing the lower end of the point section 1 in ink and collapsing and expanding the ink-sac 8. Air is expelled from and ink sucked into the latter through the passages through which ink-replacing air passes to the reservoir during the use of the pen.

The one-piece tip 9 according to this invention can be produced and finished at a relatively low cost and the pen can be assembled rapidly by unskilled labour since there is no separate fine-bore tube to be fixed in place. Another important advantage is that the bore of the "point" 10 of the tip is always in axial alignment with the rest of the tip so that the feed wire 17 may always move freely therein and thus ensure a free flow of ink. In addition, the thin-walled construction of the tip allows of a larger diameter feed-bar 16 being employed so that the latter may be made heavier than usual and thus ensure a more certain movement of the feed wire.

In a modification of the invention, the tip 9 may be screwed into the bore in the point section 1.

What we claim is:

1. Stylographic pen, particularly a self-filling stylographic pen, comprising a tubular point section having a relatively wide mouth, a tubular tip fixed in the said mouth and a fine-bore tube, which constitutes the writing point, formed with the said tip as one integral part of non-corrodible metal.

2. Stylographic pen, particularly a self-filling stylographic pen, comprising a tubular point section, a tubular tip fitted into and frictionally retained in the bore of the point section, a writing point formed integrally with the tubular tip, the point section being formed at its free end with an internal space open to the atmosphere and the tip being formed with at least one aperture affording communication between its interior and the said space.

3. Stylographic pen according to claim 1, wherein the integral writing point and tip are made of stainless steel.

4. Stylographic pen according to claim 1, in combination with a weighted feed bar contained in the tubular tip and formed with longitudinally extending feed grooves and a feed wire carried by the said bar.

5. Stylographic pen according to claim 1, in combination with a weighted feed bar contained in the tubular tip and formed with longitudinally extending feed grooves, and a feed wire carried by the said bar, the said bar being guided with a close but not frictional fit in the interior of the tubular tip.

6. Stylographic pen, particularly a self-filling stylographic pen, comprising a tubular point section having a relatively wide mouth, a tubular tip fixed in the said mouth, a fine-bore tube, which constitutes the writing point, formed with the said tip as an integral part of non-corrodible metal, a weighted feed bar guided in the interior of the tubular tip, and stop means provided in the point section and engageable with the feed bar for preventing it from falling into the ink reservoir of the pen.

7. Stylographic pen, particularly a self-filling stylographic pen, comprising a tubular point section having a relatively wide mouth, a tubular tip fixed in the said mouth and a fine-bore tube, which constitutes the writing point, formed with the said tip as one integral part of non-corrodible metal, and a weighted feed bar guided in the interior of the tubular tip and having

conical ends, the said bar being formed with longitudinal feed grooves extending over the conical ends.

8. Stylographic pen, particularly a self-filling stylographic pen, comprising a tubular point section, a tubular tip fitted into and frictionally retained in the bore of the point section, a writing point formed integrally with the tubular tip, an annular space open to the atmosphere being formed between the interior of the point section at its free end and the tubular tip and the tip being formed with at least one aperture affording communication between its interior and the said space.

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