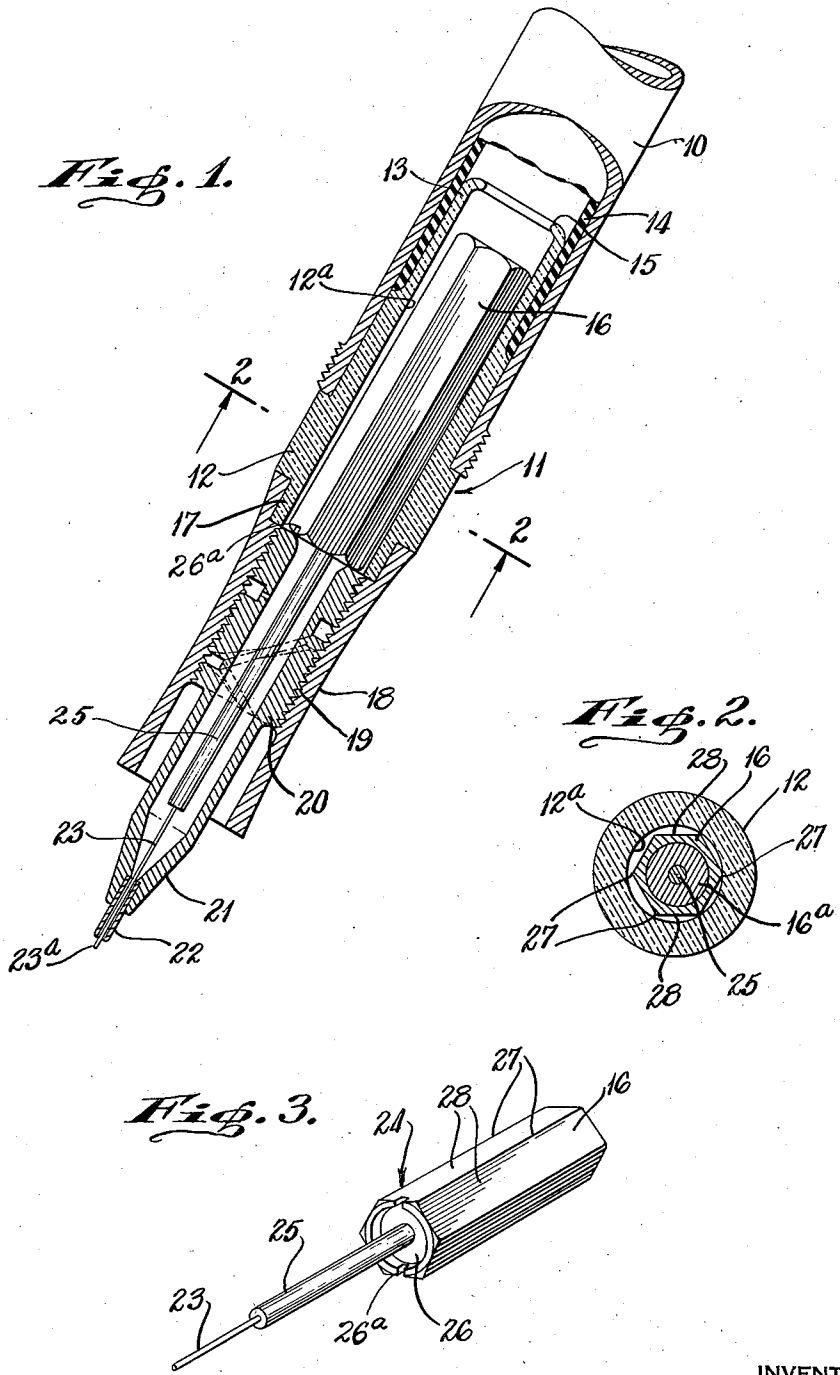


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STYLOGRAPHIC PEN

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10 Claims. (Cl. 120—44)

This invention relates to fountain pens, and particularly pens of the stylographic type employing a weighted pin or needle operating through the writing point of the pen in controlling the feed of ink; and the object of the invention is to provide an improved drop weight or needle construction wherein the body portion of the enlarged plunger or weight element is constructed of irregular cross-sectional form so as to provide a plurality of relatively fine longitudinal contact areas with the tubular section in which the weight is mounted thereby materially decreasing the frictional surface resistance upon the plunger while at the same time eliminating excessive tilting of the weighted plunger and strain upon the needle in supporting the pen in the inclined writing position; and with these and other objects in view, the invention consists in a fountain pen structure of the class and for the purpose specified which is simple in construction, efficient in use, and which is constructed as more fully hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views; and in which:

Fig. 1 is an enlarged sectional view of the writing end portion of a pen showing one adaptation of my invention.

Fig. 2 is a partial section on the line 2—2 of Fig. 1; and,

Fig. 3 is a perspective view of a drop weight and needle unit detached.

In stylographic pens of the type and kind under consideration it has been the common practice to employ weighted needle units having a cylindrical weighted body of sufficiently small outside diameter as to move freely in the tubular section in which the weight is mounted and reciprocated, while at the same time providing for the free flow of ink around the cylinder for feed through the pen. This construction has been found to be objectionable from several standpoints, first in that unnecessary and undesirable tilting of the entire unit was experienced in supporting the pen in the angular writing position which established considerable friction of the flexed needle in the tubular pen point, materially hampering the free action of the needle and also producing an undesirable frictional engagement of the cylinder with the tubular section in which the same operates. In increasing the diameter of the cylinder to eliminate the tilting tendency, insufficient clearance was provided for the free flow of ink;

and in many occasions would be frozen within the tubular section by reason of the solidification of the ink due to the restricted clearance passage provided between the weighted cylinder and the bore of the section. It is the purpose of my invention to obviate these objectionable features and characteristics of the present and conventional forms of construction by providing a drop weight or needle unit having a limited number of circumferentially spaced and longitudinally extending restricted point-like surfaces fitting snugly within the bore of a pen section, sufficient clearance being provided only to provide free sliding movement of the plunger in the bore, thereby minimizing the degree of possible tilting of the weighted plunger in the bore while at the same time providing a minimum surface engagement of the plunger with the bore of the cylinder, thus providing a freer action of the cylinder longitudinally of the section.

In Fig. 1 of the accompanying drawing, I have shown, for the purpose of illustrating one adaptation of the invention, a part of a valve 10 of a fountain pen in the open end of which is fitted what is commonly termed the point section 11, which in the construction shown comprises a cylinder portion 12 fitting snugly in the open end of the barrel and reduced at its inner end as seen at 13 to receive the rubber ink sack or well 14 of the pen, which is cemented or otherwise secured to the extension 13. The end of the extension 13 has intumed flanges 15 forming stops limiting inward movement of the plunger 16 of my improved needle unit.

Secured to the reduced end 17 of the cylinder 12 is a sleeve or tip 18 internally threaded as seen at 19 to receive the ink control feed or nozzle 20 which is more or less of conventional construction, and includes an outwardly projecting and tapered extension 21 in the free end of which is supported the pen point 22. The point 22 is of the usual or any desired tubular form and construction; and movably supported therein is the needle 23 of the needle unit designated by the reference character 24 in Fig. 3 of the drawing. This unit is commonly referred to as the drop-weight unit.

It will be understood that the needle 23 is in the form of a very fine wire; and this wire is reinforced by a tubular portion 25 which may be composed of metal, rubber, or any other material. The member 25 forms means for coupling the wire with the weighted plunger 16 proper. This plunger may be composed of metal having no effect upon ink fluids used, or may be composed

of a combination of metal enclosed in an outer jacket of rubber or other plastic material as has been the common practice in constructing other devices of this type and kind. It is also preferred
 5 that the lower end of the plunger 16 be provided with a recess or chamber 26 to act as a storage for a surplus of ink to provide a directed positive feed to the tubular member 20 in moving the
 10 pen from an inverted position into its writing position. The walls of the chamber 26 have recesses 26a for the feed of ink to said chamber.

It will also appear that the recessed end 26 of the tube rests upon the member 20 as seen in Fig. 1, which limits the outward movement of the
 15 needle 23, and normally arranges the free end 23a of the needle beyond the end of the pen point 22. Thus it will be seen that in the operation of the pen, the needle 23 is constantly moved upwardly as the pen is raised from and again moved toward
 20 a writing surface, thus reciprocating the plunger 16 upwardly and downwardly in the bore 12a of the tube or cylinder 12.

The plunger 16 in the construction shown is of hexagon cross sectional form, thus providing
 25 six restricted corners 27, circumferentially of the plunger and extending substantially the full length thereof. The diameter of the plunger between the opposed corners 27 will be slightly less than, and as a matter of fact only a few
 30 thousands less than the diameter of the bore 12a of the cylinder 12. Intermediate the corners 27 are flat surfaces 28, and the diameter of the cylinder between opposed flat surfaces 28 will be considerably less than the diameter of the
 35 bore 12a; or in other words, would be substantially equal to the normal clearance provided between the conventional round cylinders and the bore in which the round cylinder was mounted. These latter clearances will provide
 40 ample space for the free flow of ink between the plunger 16 and the wall of the cylinder 12 and will prevent any possible sticking tendency by solidifying the ink as will be apparent. In the accompanying drawing, the size of the parts,
 45 particularly as appearing in Figs. 1 and 2, are materially amplified; and in fact clearances have been somewhat exaggerated in order to clearly illustrate the invention. While admittedly there will be a slight drop or inclination of the
 50 plunger 16 in the cylinder when the pen is in an inclined writing position, being supported by two of the corners 27, engaging the wall of the cylinder 12, this slight inclination which is indicated, is not sufficient to affect in any way the
 55 free action of the needle 23 in the tubular pen point 22.

It will also be apparent that in the reciprocating movement of the plunger 16, the same will
 60 slide in the cylinder on two of the elongated point contacts 27 when the pen is in the writing position, thus materially reducing the frictional engagement between the plunger and the cylinder as will be apparent.

In Fig. 2 of the drawing, the plunger 16 has
 65 been illustrated as including an outer shell in which is a filling body 16a in connection with which the pin or rod 25 is mounted. However, as previously stated, the entire body may be of one solid construction, and the rod 25 secured
 70 therein in any desired manner.

It will be apparent that in the use of the pen, the tubular portion 12 and the extending sleeve
 75 18 are fixedly united and may be composed of different materials. In the repair or cleaning of the entire point section, the feed section may

be detached from the sleeve which will permit withdrawal of the needle unit through the open end of the sleeve 18 as will be apparent. In this way and from time to time, the several parts may be thoroughly cleaned to remove any solidified ink which may prevail therein, especially after the pen has been standing for a very long period of time without use.

It will also be apparent that my invention is not limited to any particular contour to the outer surface of the plunger as this may be modified to suit various types of construction. The principal feature is to provide a peripheral contour on the plunger which will present a plurality of relatively fine protruding ribs fitting snugly but
 1 freely in the bore of the cylinder and materially reducing the surface engagement of the plunger with the cylinder.

It will be understood that in pens of the type and kind under consideration, it is desirable to
 2 provide free action of the fine pin or needle 23 in the pen point 22 in the operation of writing with the pen. This free action improves the feed or flow of ink to the pen point thus producing free and positive functioning of the pen.
 2 Furthermore, my improved construction insures quick and immediate writing of a pen which has been supported in an inverted position, and unused for a comparatively long period of time. The plunger operates as a pump to feed ink
 3 into the pen point; and if this pump is free to act, instantaneous writing of the pen is assured.

Having fully described my invention, what I claim as new and desire to secure by Letters
 Patent, is:

1. In a stylographic pen of the class described, a pen section, a combined plunger and needle unit reciprocating in said section, the section having a tubular pen point at its free end, the
 4 needle on said unit being mounted in and movable longitudinally through the pen point in controlling the feed of ink thereto, the inner end of said unit having an enlarged elongated
 4 weighted portion, and the weighted portion of said unit having circumferentially spaced elongated ribs fitting snugly but freely within the section to provide a materially restricted surface engagement of the weighted portion in said section.

2. In a stylographic pen of the class described, a pen section, a combined plunger and needle unit reciprocating in said section, the section having a tubular pen point at its free end, the
 5 needle on said unit being mounted in and movable longitudinally through the pen point in controlling the feed of ink thereto, the inner end of said unit having an enlarged elongated
 5 weighted portion, the weighted portion of said unit having circumferentially spaced elongated ribs fitting snugly but freely within the section to provide a materially restricted surface engagement of the weighted portion in said section, said
 6 weighted portion being composed of metal, and a non-metallic rod coupling the weighted portion
 65 with said needle.

3. In a stylographic pen of the class described, a pen section, a combined plunger and needle unit reciprocating in said section, the section having a tubular pen point at its free end, the
 7 needle on said unit being mounted in and movable longitudinally through the pen point in controlling the feed of ink thereto, the inner end of said unit having an enlarged elongated
 75 weighted portion, the weighted portion of said

unit having circumferentially spaced elongated ribs fitting snugly but freely within the section to provide a materially restricted surface engagement of the weighted portion in said section, said weighted portion being composed of metal, a non-metallic rod coupling the weighted portion with said needle, and the weighted portion having a recess in the surface thereof adjacent said rod.

4. In a fountain pen of the character described, a cylindrical body, a pen point section detachable at one end of said body, a tubular pen point at the outer end of said section, a needle unit having a needle at one end movable longitudinally through the pen point and adapted to project through the pen point when the pen is in writing position, the inner end of said unit having an enlarged elongated weight member with which the needle is coupled, said member being of angular cross sectional form providing on the periphery of said member a plurality of circumferentially spaced and longitudinally extending contracted ribs fitting snugly but freely in said cylindrical body, and means limiting movement of said member in both directions in said body to control movement of the needle in said tubular pen point.

5. In a fountain pen of the character described, a cylindrical body, a pen point section detachable at one end of said body, a tubular pen point at the outer end of said section, a needle unit having a needle at one end movable longitudinally through the pen point and adapted to project through the pen point when the pen is in writing position, the inner end of said unit having an enlarged elongated weight member with which the needle is coupled, said member being of angular cross sectional form providing on the periphery of said member a plurality of circumferentially spaced and longitudinally extending contracted ribs fitting snugly but freely in said cylindrical body, means limiting movement of said member in both directions in said body to control movement of the needle in said tubular pen point, said member being of hexagon cross sectional form, and a rod coupling said needle with said member.

6. In stylographic pens of the class described, a weighted needle unit controlling feed of ink through the pen, said unit comprising an elongated weighted member of angular cross sectional form presenting on the periphery of said member a plurality of circumferentially spaced and longitudinally extending ribs, means coupling a needle with one end portion of said member to arrange the needle in wide spaced relation with said end of said member, said last named means comprising a rod, and said end of said member having a recess around said rod.

7. In stylographic pens, a point section comprising an elongated tube for detachable mounting in the barrel of the pen, a sleeve coupled with the outer end of the tube and having an internally threaded bore substantially of the diameter of the bore of said tube, a point and feed section in threaded engagement with said sleeve and having a reduced end protruding beyond the sleeve, a tubular pen point mounted in said reduced end, a needle unit comprising a needle movable in the tubular pen point, and a weighted member on the inner end of the needle and movable longitudinally of said tube, said member being of angular cross sectional form

to provide on the periphery thereof circumferentially spaced and longitudinally extending pointed portions fitting snugly but freely in the bore of said tube to guide said member in its movement longitudinally of the tube and to reduce frictional engagement of the member with said tube.

8. In stylographic pens, a point section comprising an elongated tube for detachable mounting in the barrel of the pen, a sleeve coupled with the outer end of the tube and having an internally threaded bore substantially of the diameter of the bore of said tube, a point and feed section in threaded engagement with said sleeve and having a reduced end protruding beyond the sleeve, a tubular pen point mounted in said reduced end, a needle unit comprising a needle movable in the tubular pen point, a weighted member on the inner end of the needle and movable longitudinally of said tube, said member being of angular cross sectional form to provide on the periphery thereof circumferentially spaced and longitudinally extending pointed portions fitting snugly but freely in the bore of said tube to guide said member in its movement longitudinally of the tube and to reduce frictional engagement of the member with said tube, the inner end of the tube having an inturned flange portion limiting inward movement of said weighted member, and outer movement of the weighted member being checked by said feed section.

9. In stylographic pens, a point section comprising an elongated tube for detachable mounting in the barrel of the pen, a sleeve coupled with the outer end of the tube and having an internally threaded bore substantially of the diameter of the bore of said tube, a point and feed section in threaded engagement with said sleeve and having a reduced end protruding beyond the sleeve, a tubular pen point mounted in said reduced end, a needle unit comprising a needle movable in the tubular pen point, a weighted member on the inner end of the needle and movable longitudinally of said tube, said member being of angular cross sectional form to provide on the periphery thereof circumferentially spaced and longitudinally extending pointed portions fitting snugly but freely in the bore of said tube to guide said member in its movement longitudinally of the tube and to reduce frictional engagement of the member with said tube, the inner end of the tube having an inturned flange portion limiting inward movement of said weighted member, outer movement of the weighted member being checked by said feed section, the inner end portion of said tube being reduced, and a rubber well mounted on said reduced end of the tube.

10. In stylographic pens of the class described, a weighted needle unit controlling feed of ink through the pen, said unit comprising an elongated weighted member of angular cross sectional form presenting on the periphery of said member a plurality of circumferentially spaced and longitudinally extending ribs, means coupling a needle with one end portion of said member to arrange the needle in wide spaced relation with said end of said member, said last named means comprising a rod, said end of said member having a recess around said rod, and the walls of the recess having apertures opening through outer surfaces of said member.

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