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SELF FILLING FOUNTAIN PEN

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The objects of the invention are, inter alia, to provide a pen of simple and neat construction, having a relatively large ink carrying capacity, and one which can be adapted to give a visible indication when the reservoir of the pen needs replenishment or when the ink reservoir is full or approximately so.

The present invention accordingly consists in a self-filling fountain pen comprising in combination, a writing point section, a duct passing through the said section, an air tube having one end fixed within the writing point section and in communication with the duct, an ink reservoir adapted to envelop the projecting portion of the air tube and comprising a rigid tubular plunger, and an aligned flexible open ended tubular member connected to the tubular plunger, the outer end of the tubular plunger being closed, the opposite flexible end of the reservoir being functionally secured to the inner end of the writing point section, and resilient means disposed between the rigid plunger and the inner end of the writing point section, the rigid plunger being directly urged toward the writing point section to reduce the capacity of the flexible portion of the reservoir by endwise pressure, the parts automatically returning to their normal position by the operation of the resilient means when the endwise pressure on the plunger is removed whereby ink is adapted to enter the reservoir.

The invention also consists in a fountain pen according to the preceding paragraph, further characterized in that the open end of the sleeve plunger is in direct fluid-tight association with one end of a flexible and resilient member which is connected to the inner end of the writing point section. The sleeve plunger (hereinafter referred to as the "plunger") is adapted to be reciprocated in an end-wise direction over a further tubular member (hereinafter referred to as the "air tube") the said air tube extending longitudinally through the ink reservoir and having one end in fixed relation to, and in open communication with the writing point.

The invention still further consists in a fountain pen according to either of the preceding paragraphs, characterized in that the plunger is formed wholly or partially of transparent or translucent material so as to give a visible indication when the reservoir of the pen needs replenishment or when the ink reservoir is full or approximately so.

The invention will now be described with the aid of the accompanying drawing in which:—

Fig. 1 is a longitudinal section of one form which the invention may take;

Fig. 2 is a partially dismantled view of the pen shown in Fig. 1; and

Fig. 3 is a view partly sectional of a modified detail of the pen shown in Figs. 1 and 2.

Referring now to Figs. 1 and 2 of the drawing, the pen comprises a plunger 1 which takes the form of a sleeve closed at its upper end and adapted to form part of the ink reservoir A. The opposite and open end of the plunger 1 is connected in an air- and fluid-tight manner to a flexible and resilient tubular member 3 adapted to form the second part of the ink reservoir and the opposite end of which is similarly connected to the inner end of the writing point section 5. Both the inner end of the plunger 1 and the inner end of the writing point section 5 may be formed with a lip as shown, to facilitate attachment of the member 3.

That part only of the plunger 1 adapted to project from the end of the barrel is preferably made of transparent or translucent material, or the whole of the plunger may be so made. The flexible and resilient member 3 may be made of soft rubber.

The plunger 1 is adapted to be reciprocated in an endwise direction over an air tube 6 which is secured in a bore in the feed bar 8 positioned in the writing point section 5 carrying the nib 10. A lateral duct 11 puts the air tube 6 into communication with the ink groove 12 in the feed bar. The plunger 1 is adapted to be moved by hand toward the writing point section 5 and to be returned by reason of the resiliency of the member 3 assisted by the action of the helical spring 13.

The assembly above defined (marked B in Fig. 2) is adapted to be positioned in a barrel 14, one end of which is secured by screwing at 15 to the writing point section and through the opposite end 16 of which the closed outer end of the plunger 1 is adapted to protrude for the purpose of manual manipulation.

To facilitate its movement the plunger is formed with a part 17 of slightly greater diameter than the protruding portion, this surface 17 being of such size as to be a sliding fit within the interior of the barrel 14 which thus acts as a guide for the plunger and also provides a shoulder 18 which, in association with a confronting shoulder 19 on the interior surface of the barrel 14, acts as a stop to limit the outward movement of the said plunger.

The stroke of the plunger should preferably be equal to, or only slightly less than, the dis-

tance between the end of the air tube and the end of the plunger when the latter is in its outer position.

That end of the plunger adapted to project through the end of the barrel is protected by a short cap 20 when the pen is in use, which cap may be secured by screwing to the outer end of the barrel as shown. The writing point end of the barrel 14 is also screwed at 21 to take a cap 22 of the usual kind, when the pen is not in use.

The operation of filling the pen is as follows:—

The protective cap 20 for the plunger is first removed, after which the writing point and part of the writing point section 5 are immersed in the ink supply. A part of the air within the reservoir is then expelled by pressing the plunger towards the writing point, the resilient tubular member 3 being collapsed in end-wise or concertina-like manner and the displaced air passing by way of the air tube 6 through the writing point section to the ink supply from whence it rises to the surface. Upon the release of the pressure on the plunger, the latter is returned to its normal position under the influence of the resilient tubular member assisted by the spring 13, ink passing from the supply upward through the usual ink channel 12 in the feed bar 8, and also, in lesser quantity, upward through the air tube 6, to the interior of the reservoir A.

This operation is repeated until no more bubbles appear on the surface of the ink supply, or in the case of a transparent or translucent plunger, that part projecting through the barrel gives a visible indication that the reservoir is full, after which the pen can be removed from the ink supply and the protective cap 20 positioned over the projecting end of the plunger, whereupon the pen is ready for use.

Fig. 3 shows a modified form of flexible and resilient member wherein the spring 13^a is embedded in the wall of the tubular member 3^a which may be of rubber or other flexible material or of flexible but non-resilient material.

In a further modification the spring can be located within the resilient tubular member.

Means may be provided to prevent relative rotary movement between the hollow plunger and the barrel or casing, and thus avoid the possibility of inadvertently twisting the resilient tubular member where such is used, and thus cause leakage. The means may conveniently consist in making that part of the plunger passing through the barrel or casing of polygonal cross section and correspondingly forming the end of the barrel.

The outer barrel and the writing point section together with the protective caps may be made of opaque material to meet practical or aesthetic requirements, for example, vulcanite, opaque or figured celluloid or similar material may be used. The plunger I prefer to make of transparent or translucent material, as, for example, glass, celluloid, or the like, whereby the protruding end of the said plunger will form a ready indication when the reservoir of the pen is full or needs replenishment.

I wish it to be understood that various modifications in the details of construction hereinbefore described may be made within the scope of my invention.

What I claim and desire to secure by Letters Patent is:—

1. A self-filling fountain pen comprising in combination, a writing point section, a duct passing through the said section, an air tube having

one end fixed within the writing point section and in communication with the duct, an ink reservoir adapted to envelop the projecting portion of the air tube and comprising a rigid tubular plunger, and an aligned flexible open ended tubular member connected to the tubular plunger, the outer end of the tubular plunger being closed, the opposite flexible end of the reservoir being functionally secured to the inner end of the writing point section, and resilient means disposed between the rigid plunger and the inner end of the writing point section, the rigid plunger being directly urged toward the writing point section to reduce the capacity of the flexible portion of the reservoir by endwise pressure, the parts automatically returning to their normal position by the operation of the resilient means when the endwise pressure on the plunger is removed, whereby ink is adapted to enter the reservoir.

2. A self-filling fountain pen according to claim 1 wherein the resilient means is constituted by forming the open-ended tubular member of a suitable resilient material.

3. A self-filling fountain pen according to claim 1, wherein the resilient means is constituted by a helical spring.

4. A self-filling fountain pen according to claim 1 wherein the resilient means is constituted by forming the open ended tubular member of a suitable resilient material supplemented by a helical spring.

5. A self-filling fountain pen comprising in combination, a writing point section, a duct passing through the said section, an air tube having one end fixed within the writing point section and in communication with the duct, an ink reservoir adapted to envelop the projecting portion of the air tube and comprising a rigid tubular plunger, and an aligned flexible open ended tubular member connected to the tubular plunger, the outer end of the tubular plunger being closed, the opposite flexible end of the reservoir being functionally secured to the inner end of the writing point section, resilient means disposed between the rigid plunger and the inner end of the writing point section, and an outer barrel having one end rigidly secured to the writing point section and serving as a guide for the plunger, the outer end of which is adapted to protrude therefrom to facilitate direct manual movement of the said plunger.

6. A self-filling fountain pen comprising in combination, a writing point section, a duct passing through the said section, an air tube having one end fixed within the writing point section and in communication with the duct, an ink reservoir adapted to envelop the projecting portion of the air tube and comprising a rigid tubular transparent or translucent plunger, and an aligned flexible open ended tubular member connected to the tubular plunger, the outer end of the tubular plunger being closed, the opposite flexible end of the reservoir being functionally secured to the inner end of the writing point section, and resilient means disposed between the rigid plunger and the inner end of the writing point section.

7. A self-filling fountain pen comprising in combination, a writing point section, a duct passing through the said section, an air tube having one end fixed within the writing point section and in communication with the duct, an ink reservoir adapted to envelop the projecting portion of the air tube and comprising a rigid tubular plunger, and an aligned flexible open ended

tubular member connected to the tubular plunger, the outer end of the tubular plunger being closed, the opposite flexible end of the reservoir being functionally secured to the inner end of the writing point section, resilient means disposed between the rigid plunger and the inner end of the writing point section, and an outer barrel having one end rigidly secured to the writing point section and serving as a guide for the plunger, the outer end of which is adapted to protrude therefrom to facilitate direct manual movement of the said plunger the protruding portion having a transparent or translucent wall.

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