

## PATENT SPECIFICATION



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## PROVISIONAL SPECIFICATION

## Improvements in Self-filling Fountain Pens

- We, EDWARD STEPHEN SEARS, of 23, Oaklands Avenue, Oxhey, Hertfordshire, a British Subject, and MABIE TODD & COMPANY LIMITED, of Swan House, 133 and 135, Oxford Street, London, W.1, a Company organised under the laws of Great Britain and Northern Ireland, do hereby declare the nature of this invention to be as follows:—
- 10 The invention relates to self-filling fountain pens of the kind having an ink reservoir adapted to be filled or replenished by the reciprocation of a plunger.
- 15 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.
- 20 According to the present invention a pen of the type above referred to is provided with a plunger in the form of a sleeve closed at its outer end and adapted to form one part of the ink reservoir and having its opposite end in direct fluid-tight association with one end of a
- 30 flexible and resilient or rigid tubular member, adapted to form a second part of the ink reservoir and which is either connected to, or forms an extension of, the inner end of the writing point section.
- 35 The sleeve plunger (hereinafter referred to as the "plunger") is adapted to be reciprocated in an endwise direction over a second 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.
- 45 The plunger is adapted to be moved towards the writing point against the action of a spring or other resilient member.
- 50 The assembly above defined is adapted to be positioned within a barrel, one end of which is secured by screwing or by a plug fit into the writing point section and through the opposite end of which the closed outer end of the plunger is adapted to protrude for the purpose of manual reciprocation.
- The plunger is so formed and proportioned as to define a portion of slightly greater diameter than the protruding portion of the sleeve, this surface of greater diameter being a sliding fit within the interior of the barrel, which latter thus acts as a guide for the plunger. The inner cylindrical face of the barrel is conveniently provided with a shoulder which, in association with the confronting shoulder on the outer surface of the plunger formed by the differences in its diameter, acts as a stop to limit the outward movement of the said plunger.
- The tubular member in direct fluid-tight association with the plunger and forming a part of the ink reservoir, may be constituted by a flexible and resilient or by a rigid member.
- Preferably, the tubular member takes the form of an open-ended sleeve of rubber or like resilient material, one end of the said tube being connected in a fluid-tight manner to the open end of the plunger, the other open end being similarly secured to the inner end of the writing point section. Both the open end of the plunger and the inner end of the writing point section may be provided with a lip to assist in making a good joint.
- The plunger is adapted to collapse the resilient tubular member endwise when projected forward and to be returned to its normal position by reason of the resiliency of the material. This return movement may however be assisted by means of a helical or other spring disposed either externally or internally of the resilient tubular member, or may be embedded in, and thus form part of, the resilient wall of the tubular member.
- Where a rigid tubular member is used the said member may take the form of an integral extension of the writing point section, or may be formed separately therefrom and subsequently secured thereto in any suitable manner.
- With this form the plunger is adapted

[Price 1/-]

to reciprocate over the said tubular member, packing means being provided if necessary to ensure fluid-tight sliding engagement between the parts. A helical  
5 spring is interposed between the inner annular face of the open end of the plunger and an abutment or seating provided on the writing point section. This  
10 spring functions to return the plunger to its normal position after being manually pressed towards the writing point.

The air tube, which is of relatively small internal diameter, is connected at  
15 its fixed end to a duct which is in communication with an ink channel leading from the interior of the reservoir to the writing point. The air tube is preferably axially disposed relative to the barrel and its length should preferably be such  
20 that its outer free end is almost in contact with the internal closed face of the plunger when the said plunger is pressed forward to its full extent. That end of  
25 the plunger adapted to project through the end of the barrel is preferably protected by means of a short cap when the pen is not in use, which cap may be screwed or otherwise secured to the outer  
30 end of the barrel. The writing point end of the barrel may also be screwed to take a cap of the usual kind when the pen is not in use.

The outer barrel and the writing point  
35 section together with the protective caps may be made of opaque material to meet practical or æsthetic requirements, for example, vulcanite, opaque or figured celluloid or similar material may be  
40 used. The plunger we prefer to make of transparent or translucent material, as, for example, glass, celluloid, or the like, whereby the protruding end of the said sleeve will form a ready indication when

the reservoir of the pen is full or needs 45 replenishment.

The operation of filling the pen is as follows:—

The protective cap for the end of the plunger is first removed, after which the  
50 writing point and part of the writing point section are immersed in the ink supply. A part of the air within the reservoir is then expelled by pressing  
55 the plunger towards the writing point, the air passing by way of the air tube through the writing point section to the ink supply from which it rises to the surface. Upon the release of the pressure  
60 on the plunger, the latter is returned to its normal position under the influence of the resilient tubular member and/or the spring, ink passing from the supply  
65 upward through the usual ink channel in the feed bar, and also, in lesser quantity, upward through the air tube, to the interior of the reservoir.

This operation is repeated until no more bubbles appear on the surface of  
70 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  
75 from the ink supply and the protective cap positioned over the projecting end of the plunger, whereupon the pen is ready for use.

While we have now described two  
80 forms which the invention may take, we wish it to be understood that various modifications in the details of construction hereinbefore described may be made within the scope of our invention.

Dated this 31st day of October, 1934.

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## COMPLETE SPECIFICATION

### Improvements in Self-filling Fountain Pens

85 We, EDWARD STEPHEN SEARS, of 23, Oaklands Avenue, Oxhey, Hertfordshire, a British Subject, and MABIE TODD & COMPANY LIMITED, of Swan House, 133 and 135, Oxford Street, London, W.1, a  
90 Company organised under the laws of Great Britain and Northern Ireland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described  
95 and ascertained in and by the following statement:

The invention relates to self-filling fountain pens of the kind having an ink reservoir adapted to be filled or

replenished by the reciprocation of a 100 plunger.

The objects of the invention are, inter alia, to provide a pen of simple and neat construction having a relatively large  
105 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  
110 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 characterised in that resilient means is constituted by forming the open-ended tubular member of a suitable resilient material.

The invention still further consists in a fountain pen according to either of the preceding paragraphs, characterised 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.

Our invention will now be described with the aid of the accompanying drawings 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.

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 drawings, 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 sleeve 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 distance 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 8 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 endwise 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

5 is returned to its normal position under the influence of the resilient tubular member 3 assisted by the spring 13, ink passing from the supply upward through the usual ink channel 12 in the feed bar 10 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 12<sup>a</sup> is embedded in the wall of the tubular member 3<sup>a</sup> which may be of rubber or other flexible material or of flexible but non-resilient material.

30 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.

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

While we have now described one form with modifications which the invention 60 may take, we wish it to be understood that various modifications in the details of construction hereinbefore described may be made within the scope of our invention.

65 Having now particularly described and

ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim 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 whose action is supplemented by a helical spring.

5. A self-filling fountain pen according to the preceding claims, characterised in that the plunger is formed either wholly or partially of transparent or translucent material for the purpose specified.

6. A self-filling fountain pen according to the preceding claims, characterised in that the parts forming the ink reservoir are adapted to be positioned in a barrel or outer casing.

7. A self-filling fountain pen according to claim 6, characterised in that the outer closed end of the plunger is adapted to project from the end of the barrel for the purpose specified.

8. A self-filling fountain pen according to claim 6 or 7, characterised in that the barrel is so formed as to limit the

outward movement of the reciprocable plunger.

5 9. A self-filling fountain pen according to claim 6, 7 or 8, characterised in that the barrel acts as a guide to the end-wise movement of the plunger.

10. A self-filling fountain pen of the plunger operated type, constructed,

arranged and adapted to operate substantially as described with reference to the 10 accompanying drawings.

Dated this 4th day of July, 1935.

MEWBURN, ELLIS & Co.,  
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Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1936.

[This Drawing is a reproduction of the Original on a reduced scale.]

