

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in Self-filling Fountain Pens

We, MABIE TODD & COMPANY LIMITED, of Sunderland House, Curzon Street, Mayfair, London, W.1, a Company organised under the laws of Great Britain and Northern Ireland, LESLIE WILLIAM JOHNSON, of "St. Helier," Marsworth Avenue, Pinner, Middlesex, and EDWARD STEPHEN SEARS, of 23, Oaklands Avenue, Oxhey, Hertfordshire, both British Subjects, do hereby declare the nature of this invention to be as follows:—

The invention relates to self-filling fountain pens.

The main objects of the invention are to increase the ink carrying capacity of such pens and also to provide for a more speedy filling.

The ink reservoir is formed in two main parts in substantial alignment with one another, one part being constituted by the rigid barrel of the pen or a portion thereof, and the other by the flexible sac. A tubular member (hereinafter referred to as the air tube) projects from the writing point section into the rigid barrel, and a plunger is disposed centrally within the sac when the parts are in their normal position. When, however, the writing point is immersed in a vessel of ink and the plunger is moved toward the writing point, the capacity of the compound reservoir so defined is reduced by the collapse of the sac in an endwise direction due to the movement of the plunger. On the reverse movement of the plunger the sac resumes its original size and shape by the action of a helical spring, thus tending to form a vacuum in the ink reservoir, with a result that ink is adapted to enter the reservoir.

In a preferred construction the tubular barrel is formed with two bores, the lower or that adjacent the writing point being of slightly less diameter than the upper or larger bore to form a shoulder. Both the plunger and the flexible sac forming one part of the ink reservoir are normally disposed within the upper bore, while the air tube is adapted to extend from the writing point section into the lower part of the barrel which forms the other part of the ink reservoir. The lower end of the air tube is in communication with the

ink duct of the writing point and the tube is offset within the barrel to allow for the reciprocation of the plunger.

The shoulder formed by the two diameters of the barrel acts as a seating for a fixed plunger guide of substantially disc form. This guide is centrally bored with a square hole and the engaging part of the plunger is of corresponding cross-section to prevent relative rotation between the two parts. There is a slight clearance between the plunger and the bore of its guide to allow for the passage of air or writing fluid, as will appear later.

The plunger guide also serves to close the lower end of the flexible sac being associated for this purpose with a screwed plug fitting into a correspondingly screwed part near the base of the upper and enlarged bore of the barrel, the free lower end of the flexible sac being positioned in a fluid-tight manner between the screwed plug and the plunger guide. This plunger guide also serves as the lower abutment for a helical spring the opposite end of which abuts against an annular facing formed by an enlargement at the back end of the plunger. The opposite end of the plunger is reduced in diameter for a short distance and screwed to receive a stop to limit its outward movement. The back end of the plunger is enlarged to define the collar which serves as a means of attachment for the back end of the flexible sac which is secured thereto in a fluid-tight manner.

The main part of the plunger is formed with a central bore to receive an operating screw which is adapted to pass through a correspondingly screwed and flanged nut which is screwed externally and thereby secured to a correspondingly screwed counter-bore of the plunger.

This screw which is adapted to form an extension of the plunger passes freely through a central bore in the closed outer end of the barrel and is rigidly fixed in a knob or button by which the parts are operated.

The screw is of quick pitch or may be a spiral, the inner end of the thread or spiral being stopped however at a short

[Price 1/-]

distance from the end of the member to prevent its complete withdrawal from the plunger.

To operate the pen and assuming that
 5 the parts are in their normal position, the writing point together with the end of the writing point section are immersed in the ink supply. The long pitch screw is projected from the barrel by the rotation of
 10 the operating knob or button, whereupon the plunger is reciprocated by the reciprocation of the screw, the inward movement of the knob projecting the plunger toward the writing point and at the same
 15 time collapsing the flexible sac in an endwise direction against the action of the helical spring. Thus the air capacity of the flexible part of the sac or reservoir is considerably reduced, the air being forced
 20 by way of the air tube outward through the ink supply. The outward movement of the plunger due to the operation of the knob causes the flexible sac to resume its original size and shape under the action
 25 of the helical spring and the plunger to return to its normal position, thus tending to form a vacuum within the reservoir with a result that ink passes from the source of supply into the reservoir, this
 30 operation being repeated if necessary to completely fill the pen.

If desired, the pen barrel or casing may be formed in two parts transversely having their joint disposed transversely and
 35 medially of the screwed plug by which means the upper part of the barrel or casing can be readily removed to give access to the sac and immediately associated parts, and also to assist in their
 40 assembly.

In some cases the stop on the lower end of the plunger may be of substantially cylindrical form having a diameter only slightly less than the internal diameter
 45 of the barrel to allow for the passage of fluid therebetween. In this case the outer surface of the stop is formed with a longitudinal groove or slot by which means the end of the air tube is freely slidable
 50 therein. This arrangement also prevents the plunger from wobbling during its functional movement. Such a stop can be attached to the plunger by screwing or other means.

Alternatively, the air tube may be axially disposed in the barrel and the inner end of the plunger may be centrally bored to take the end of the air tube substantially in the manner shown and described
 60 in the specification of prior Letters Patent No. 435,482.

If desirable the lower or reservoir portion of the barrel or casing may be formed with transparent or translucent material
 65 so that the contents, if any, are visible.

The writing point end of the casing or barrel can be screwed externally to take a cap of the usual kind.

In a modification, the operating screw is omitted and the ink reservoir is formed
 70 in two parts, i.e., a rigid barrel and a flexible sac. The plunger is in direct association with the enveloping sac, the inner end of the plunger passing through a plunger guide in association with a
 75 screwed plug which also serves to secure the lower open end of the flexible sac to the lower portion of the barrel in a fluid-tight manner. The upper end of the plunger is enlarged or is fitted with a
 80 suitably shaped button to define an annular surface between which and the confronting face of the plunger guide the helical spring is disposed.

Where a button is used this may be
 85 screwed to the end of the plunger, the sac being attached thereto in a fluid-tight manner by means of a sleeve or band adapted to be forced over the end of the barrel when the sac is in position thereon. The inner face of the sleeve may be
 90 ribbed and the button correspondingly recessed to assist in retaining the parts.

In an alternative construction the plunger may be hollow and fitted with an axially disposed screwed metal or other rod of such a length as to project from the ends of the plunger to receive the plunger stop disposed at one end thereof and the
 100 button at the other end thereof.

In some cases the outer end of the sac may be closed, the outer enlargement or button on the plunger correspondingly formed, or the sac may be of the double open ended type, and a closure of the kind
 105 described in the previous construction may be used, the internal screw for operating the extension screw would be omitted, the end of the sac being secured to the enlargement by means of a ring or other
 110 suitable member. In this particular construction the sac and its immediately associated parts are protected when not in use by means of a cap adapted to screw on to a projecting part of the screwed plug
 115 associated with the plunger guide.

To operate this movement the cap would be removed, the writing point and part of the writing point section are immersed beneath the surface of the ink and the
 120 plunger reciprocated by the fore finger, the sac being collapsed in an endwise direction, the displaced air passing by way of the air tube through the ink in the ink supply and the parts being returned
 125 to their normal position by the action of the helical spring, thus tending to create a vacuum and causing ink to flow into the reservoir.

We wish it to be understood that various 130

modifications may be made in the details of construction hereinbefore described within the scope of the invention.

Dated this 5th day of September, 1936.
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Chartered Patent Agents.

COMPLETE SPECIFICATION

Improvements in Self-filling Fountain Pens

We, **MARIE TODD & COMPANY LIMITED**,
5 of Sunderland House, Curzon Street, Mayfair, London, W.1, a Company organised under the laws of Great Britain and Northern Ireland, **LESLIE WILLIAM JOHNSON**, of "St. Helier," Marsworth Avenue,
10 Pinner, Middlesex, and **EDWARD STEPHEN SEARS**, of 23, Oaklands Avenue, Oxhey, Hertfordshire, both British Subjects, do hereby declare the nature of this invention and in what manner the same is to
15 be performed to be particularly described and ascertained in and by the following statement:—

The invention relates to self-filling fountain pens of the type having an ink
20 reservoir comprising a flexible sac and a rigid barrel, wherein the flexible sac is adapted to be collapsed in an endwise direction and returned to its original form, to effect the filling or replenishment
25 of the pen.

Such an arrangement is described and shown in the specification of our prior Letters Patent No. 451,275.

The main object of the present invention is to provide for a more speedy filling of pens of this type.

The invention accordingly consists in a fountain pen of the type above referred to, having an ink reservoir comprising a
35 flexible sac and a rigid barrel, wherein the flexible sac is adapted to be collapsed in an endwise direction and to be returned to its original form by the reciprocation of a member disposed within the said sac, the said member being adapted to act also
40 as a guide.

The invention also consists in a self-filling fountain pen according to the preceding paragraph wherein the guide is
45 bored longitudinally and fitted with an operating member adapted to be disposed in the said bore when the pen is in use and to be extended therefrom for the purpose of reciprocating the guide.

The invention further consists in other features which will become apparent as the description proceeds, and be hereinafter specifically claimed.

In the accompanying drawings, which
55 show by way of example two preferred embodiments of our invention:—

Fig. 1 is a longitudinal section of one form of pen showing the several parts in

their normal position for use.

Fig. 2 is also a longitudinal section of
60 the upper part only of the pen shown in Fig. 1 with the operating member in its functional position.

Fig. 3 is a longitudinal section of that part of the pen shown in Fig. 2 having the
65 guide projected into the pen barrel and the sac collapsed in an endwise direction due to the operation of the operating member.

Fig. 4 shows in vertical section a modification of the upper part of the pen
70 shown in Fig. 1.

Fig. 5 is a section on the line V—V of Fig. 4, and

Fig. 6 is a section on the line VI—VI
75 of Fig. 4.

Like parts are indicated by like reference numerals in all the figures, the numerals of corresponding but modified parts being qualified by an index letter.
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Referring now more particularly to Figs. 1—3 of the drawings, the pen comprises an ink reservoir formed in two main parts in alignment with one another, one part, the lower, being constituted by a
85 rigid barrel 2, and the other or upper part by the flexible sac 3. The guide 5 which is disposed within the sac 3 is of square or polygonal cross section and bored internally for a part of its length to take an
90 operating member 7 in the form of a screwed rod, the outer end of which is fitted with an actuating knob or button 9. A tubular member 12 (hereinafter referred to as the air tube) projects from the writing
95 point section 14 into the rigid barrel being offset in the example shown, in respect of the axis of the barrel.

The tubular barrel is formed with two bores, the lower, or that adjacent the
100 writing point, being of slightly less diameter than the upper or larger bore, to form a shoulder 16. This shoulder acts as a seating for a fixed member 18 of substantially disc form. This member is
105 centrally bored with a square hole to prevent rotation of the guide 5. There is a slight clearance at 20 between the guide and the bore of the member 18 to allow for the passage of air or writing fluid, as will
110 appear later.

The member 18 also serves to secure the lower end of the flexible sac 3, being asso-

ciated for this purpose with a screwed plug 22 fitting into a correspondingly screwed part near the base of the upper bore of the barrel 2, the free lower end of the flexible sac being secured in a fluid-tight manner between the screwed plug 22 and the member 18. This disc 18 also serves to define a collar 26, the lower end of which is formed with a bead or enlargement which facilitates the fluid-tight attachment of the back end of the flexible sac to the said collar. The lower face 28 of this collar also acts as an abutment for the upper end of the helical spring 24. If necessary the part 26 may be formed separately from the guide and subsequently rigidly secured thereto. The opposite end of the guide is reduced in diameter for a short distance and screwed to receive a stop to limit its outward movement. The relative positions of the stop 30 and the member 18 are such as to allow the passage of air or writing fluid therebetween when the guide is in its extreme inward or normal writing position.

The operating screw is adapted to pass through a correspondingly screwed and flanged nut 32 which is screwed externally and thereby secured to a correspondingly screwed counter-bore of the guide enlargement 26.

This screw which is adapted to form an extension of the guide when in the position shown in Figs. 2 and 3, passes freely through a central bore 34 in the closed outer end of the barrel.

The screw on the member 7 is of quick pitch or may be spiral the inner end of the thread or spiral being stopped however at a short distance from the end of the member as at 36 to prevent its complete withdrawal from the guide 5.

The pen barrel or casing is preferably formed in two parts transversely as shown having their junction disposed medially of the screwed plug 22 by which means the upper part of the barrel or casing can be readily removed to give access to the sac and immediately associated parts, and also to assist in their assembly.

To operate the pen and assuming that the parts are in their normal position as shown in Fig. 1, the writing point together with the end of the writing point section 14 are immersed in the ink supply. The long pitch screw 7 is projected from the bore of the guide by the rotation of the operating knob or button 9 to the position shown in Fig. 2, whereupon the guide 5 is reciprocated by the reciprocation of the knob or button 9 and screw 7, the inward movement of the knob projecting the guide toward the writing point

and at the same time collapsing the flexible sac 3 in an endwise direction against the action of the helical spring 24 (see Fig. 3). Thus the air capacity of the flexible part of the sac or reservoir is considerably reduced, the air being forced by way of the air tube 12 outward through the ink supply. The outward movement of the guide 5 due to the operation of the knob 9 assisted partly by the action of the spring 24 and partly by the resiliency of the sac causes the flexible sac to resume its original size and shape and the guide to return to its normal position, thus tending to form a vacuum within the reservoir with a result that ink passes from the source of supply into the reservoir, this operation being repeated if necessary to completely fill the pen.

In the modification shown in Figs. 4, 5 and 6 the operating screw is omitted, the guide 5a being in direct association with the enveloping sac 3a forming the upper part of the ink reservoir. The inner end of the guide 5a passes through the disc 18a in association with the screwed plug 22a which also serves to secure the lower open end of the flexible sac to the lower portion 2a of the barrel in the manner previously described with reference to Figs. 1—3. The upper end of the guide is either enlarged or is fitted with a suitably shaped button 9a as shown to define a lower annular surface 28a between which and the confronting face of the member 18a the helical spring 24a is disposed.

In the form shown the button 9a is screwed to the end of the guide, the sac being attached thereto in a fluid-tight manner by means of a sleeve or band adapted to be forced over the end of the button when the sac is in position thereon. The inner face of the sleeve is preferably ribbed at 41 and the button correspondingly recessed to assist in retaining the sac.

The guide is hollowed as shown and fitted with an axially disposed screwed metal or other rod 42 of such a length as to project from the ends of the guide to receive the stop 30a disposed at one end thereof and the button at the other end thereof.

In the construction shown the outer end of the sac 3a is closed, the outer enlargement or button on the guide 9a being domed or otherwise correspondingly formed. Alternatively the sac may be of the double open ended type, and a closure of the kind described in the previous construction may be used, but the internal screw for operating the extension screw would be omitted, the end of the sac being secured to the enlargement by means of a ring or other suitable member. In this

particular construction the sac and its immediately associated parts are protected when not in use by means of a cap 44 adapted to screw on to a projecting part of the screwed plug associated with the member 18a.

The stop 30a on the lower end of the guide is of substantially cylindrical form having a diameter only slightly less than the internal diameter of the barrel to allow for the passage of fluid therebetween. In this case the outer surface of the stop is formed with a longitudinal groove or slot 31a to allow for the movement of the guide, the end of which in the particular examples shown extends beyond the upper end of the air tube. This arrangement also prevents the guide from wobbling during its functional movement. Such a stop can be attached to the guide by screwing or other means. This form of stop may also be used in the arrangement described with reference to Figs. 1—3 of the drawings.

To fill the pen the cap is first removed, the writing point and part of the writing point section being then immersed beneath the surface of the ink and the guide 5a reciprocated by the fore finger, the movement of the guide toward the writing point serving to collapse the sac 3a in an endwise direction, the displaced air passing by way of the air tube 12a through the ink in the ink supply and the parts being returned to their normal position by the action of the helical spring 24a, thus tending to create a vacuum and causing ink to flow into the reservoir.

In either form of pen the lower or rigid reservoir portion of the barrel or casing may be formed from transparent or translucent material so that the contents, if any, are visible. The writing point end of the casing or barrel can be screwed externally to take a cap of the usual kind.

Further, and this also applies to either construction hereinbefore described, the air tube may be axially disposed in the barrel and the inner end of the guide may be centrally bored to take the end of the air tube.

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 of the type having an ink reservoir comprising a flexible sac and a rigid barrel, wherein the flexible sac is adapted to be collapsed in an endwise direction and to be returned to its original form by the reciprocation of a member disposed within the said sac, the said member being adapted to act also

as a guide.

2. A self-filling fountain pen according to claim 1 wherein the guide is bored longitudinally and fitted with an operating member adapted to be disposed in the said bore when the pen is in use and to be extended therefrom for the purpose of reciprocating the guide.

3. A self-filling fountain pen according to claim 1, or 2, wherein the operating member takes the form of a screwed rod.

4. A self-filling fountain pen according to claim 1, 2 or 3 wherein the guide and the sac tend to maintain their normal position under the action of a spring.

5. A self-filling fountain pen according to claims 1, 2, or 3, wherein the operating member is adapted to pass through the end of the barrel or casing.

6. A self-filling fountain pen according to the preceding claims wherein the outer end of the operating member is fitted with a button adapted to abut against the outer end face of the casing when the pen is in use.

7. A self-filling fountain pen according to the preceding claims wherein the guide is slidable within the fixing member for the inner end of the sac.

8. A self-filling fountain pen according to the preceding claims wherein the outer end of the guide is formed or provided with a collar serving as a means for attachment for the outer end of the sac.

9. A self-filling fountain pen according to claim 8 wherein the collar or its immediately associated parts is bored and screwed internally to act as a nut for the correspondingly screwed operating member.

10. A self-filling fountain pen according to any one of claims 3, 5, 6, 8 or 9 wherein the inner end of the screwed operating member is left with a blank portion to prevent the complete withdrawal of the said operating member from the proximate end of the guide.

11. A self-filling fountain pen according to claim 1 wherein the outer end of the sac is closed and supported by an internal enlargement or attachment formed on or fitted to the outer end of the guide.

12. A self-filling fountain pen according to claim 1, constructed, arranged and adapted to operate substantially as described with reference to Figures 1, 2 and 3, or 4, 5 and 6 of the accompanying drawings.

Dated this 4th day of September, 1937.

MEWBURN, ELLIS & CO.,
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Chartered Patent Agents.

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

