PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to Self-filling Fountain Pens

We, ARTHUR EDWARD ANDREWS, and HENRY STANSER BAILEY, both Subjects of the King of Great Britain, and both of Tudor Grove, Well Street, Hackney, London, E.9, do hereby declare the nature of this invention to be as follows:—

The present invention concerns improvements in or relating to self-filling fountain pens of the type (hereinafter referred to as the type specified) which is known as sacless, that is, in which the ink is contained in the barrel of the pen in contradistinction to being contained in a collapsible ink sac, and in which there is extending longitudinally of the barrel an air tube that is not connected to the feed section of the pen.

The chief object of the present invention is to provide a pen of the type specified which shall be of simple and cheap construction and shall not sacrifice reliability in attaining these advantages.

One feature of the invention is a self-filling fountain pen of the type specified which is valveless and which comprises a barrel open at each end, a feed and feed section of usual kind closing the barrel at the lower end, a collapsible bag attached to the upper end of the barrel, and an air-tube acting as a stopper for the upper end of the barrel except for a breathing channel which connects the bag with the upper end of the barrel, the air-tube extending down into the lower end of the barrel.

The various objects and the several features of the invention will become more fully apparent to those skilled in the art from the following description of one construction of pen illustrative of the invention.

The pen about to be described comprises a transparent barrel which itself acts as an ink reservoir. Into one end (hereinafter referred to as the lower end) of the barrel there is screwed in usual manner a feed section of usual form that carries the feed and nib. The outer surface of the lower end of the barrel is threaded for the reception in usual manner of an end cap which protects the nib when the pen is not in use.

[*Price* 1/-]

Close to the upper end of the barrel there is a reduced portion which is externally threaded for the reception of a cover-piece to enclose the collapsible part of the filling mechanism to be described. Beyond this the end of the barrel is still further reduced to form a neck on to which is fitted an elongated rubber bag which normally tends to expand.

The central hole in the neck (the extension in the neck of the interior of the barrel) has fitted into it tightly a small air-tube which extends down through the centre of the barrel close to the upper end of the feed section. Indeed, it may touch the feed section, but in this case the end is chamfered off at one side so that the interior of the air-tube is not closed by the contact with the feed section; such a construction makes for ease of assembly. A breathing channel is formed in the inner surface of the neck to provide a small breathing hole connecting the interior of the upper end of the barrel with the interior of the rubber bag; alternatively the channel could be formed in the exterior wall of the upper part of the air-tube. The cross-sectional area of the channel is considerably smaller than the cross-sectional area of the interior of the air-tube, the arrangement being such that on pressure being applied to the bag, the air therein is expelled chiefly through the air-tube. Thus the air-tube is merely plugged into the barrel and can readily be removed for cleaning by pressing upwardly on its lower end.

One advantage of this construction is that if (as is contemplated) the barrel is moulded, then the channel can be formed during the moulding which cheapens the production considerably. Another advantage is that with a barrel open at both ends when made the moulding is easier than if the barrel were closed at one end. If desired the end of the air-tube which plugs into the neck of the barrel may be enlarged so that the interior diameter of the neck is considerably greater than the exterior diameter of that part of the air-tube which does not act as a plug. A further advantage is that no valve is required; also, the amount of mechanism

required is very small. Again, the rubber bag is self-expanding and does not have to operate any mechanism. Also, the few parts are easily and cheaply assembled in correct position.

The operation is as follows:—The cover-piece is removed to expose the rubber bag. The feed section is dipped in ink and the rubber bag collapsed by pressing it between the finger and thumb. This drives air out of the bag through the air-tube (and to a small extent through the channel) into the barrel and thence out through the feed section. The bag is then released; it expands and draws air from the barrel through the channel and the air-tube and so draws ink into the barrel; when the lower end of the air-tube is sealed by the rising ink the air in the barrel is drawn into the bag through the channel only. This operation is repeated until the barrel is full to the neck when the ink will seal the breathing channel.

In order to avoid the necessity of exposing the rubber bag, mechanism may be providing for collapsing the latter without removing its cover-piece. One such mechanism will now be described. Within the cover-piece (which may be after attachment fixed to the barrel as by a pin) and surrounding the bag is a coiled spring, the upper end of which rests against a disc on the end of a plunger which passes through a central hole in the upper end of the cover-piece. On the upper end of the plunger is a small cup-piece which is internally threaded and which is screwed on to the upper end of the cover-piece which is provided for this purpose with a reduced end. Normally the plunger is at the lower end of its stroke with the bag collapsed. When the pen is to be filled the cup-piece is unscrewed and released so that the spring drives the plunger upwardly and permits the rubber bag to expand; the plunger is then forced inwardly and again released; this operation is repeated until the pen is full.

Dated this 30th day of May, 1934.
For the Applicants,
RAWORTH MOSS & COOK,
75, Victoria Street, London, S.W.1,
Chartered Patent Agents.

COMPLETE SPECIFICATION

Improvements in or relating to Self-filling Fountain Pens

We, ARTHUR EDWARD ANDREWS, and HENRY STANSER BAILEY, both Subjects of the King of Great Britain, and both of Tudor Grove, Well Street, Hackney, London, E.9, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention concerns improvements in or relating to self-filling fountain pens of the type (hereinafter referred to as the type specified) which is known as sacless, that is, wherein the barrel of the pen itself acts as the ink reservoir in contradistinction to acting as a mere cover for a collapsible rubber sac which is provided as the ink reservoir, and which is provided with an air tube that extends longitudinally of the barrel and that is open to the lower end of the barrel.

The chief object of the present invention is to provide a pen of the type specified which shall be of simple and cheap construction and shall not sacrifice reliability in attaining these advantages.

One feature of the invention is a self-filling fountain pen of the type specified which is valveless and which comprises a barrel open during manufacture at each end, a feed and feed section of usual kind connected to the barrel at the lower end, a collapsible bag attached to the upper end of the barrel, an end-wall at the upper end of the barrel dividing the barrel from the bag, a stationary air-tube inserted into an opening in the end-wall, and a breathing or choke channel that connects the bag with the upper end of the barrel, the air-tube extending down into and being always open to the lower end of the barrel (for example, having its lower end spaced from the feed section), and the cross-sectional area of the breathing channel being considerably smaller than the cross-sectional area of the interior of the air-tube in order to control the expulsion of air from the bag.

The invention will become more fully apparent to those skilled in the art from the following description, in conjunction with the accompanying drawings, of three constructions of pen illustrative of the invention.

In the drawings,

Fig. 1 is an elevation, mostly in section, of one construction of pen;

Fig. 2 is an elevation, partly in section, of the top part of a second construction; and

Fig. 3 is an elevation, partly in section, of a third construction.

The first pen about to be described comprises a translucent barrel 11 which itself acts as an ink reservoir. Into one end

(hereinafter referred to as the lower end) of the barrel there is screwed in usual manner a feed section 13 of usual form that carries the feed and nib. The outer surface of the lower end of the barrel is threaded at 15 for the reception in usual manner of an end cap which protects the nib when the pen is not in use.

Formed integrally with the upper end of the barrel 11 is a plug 17 through which there is a central hole 19. The plug 17 has a reduced portion which is externally threaded at 21 for the reception of a cover-piece 23 to enclose the collapsible part of the filling mechanism to be described. Above this the plug is still further reduced to form a head 25 joined to the rest of the plug by a neck 27.

Over the head 25 there is fitted an elongated rubber bag 29, which normally tends to expand and the lower end of which embraces the neck 27. Extending from the upper end of the rubber bag 29 is a waist 31 and a nodule 33.

The upper end of the cover-piece 23 has a reduced portion 35 providing an interior shoulder 37 and an exterior thread 39. Within the reduced portion 35 is a plunger head 41 having an upper threaded recess 43 into which the nodule 33 is forced through a hole in the lower end of the head. A plunger-rod 45 screws into the head 41 and grips the nodule in the recess 43. Upon the upper end of the plunger-rod 45 there is rotatably mounted by any suitable means a cup-piece 47 which is internally threaded so that it can (without rotating the plunger) be screwed on to the thread 39 of the cover-piece 23 as indicated in chain lines in Fig. 1. In this position the plunger is at the lower end of its stroke and the rubber bag is collapsed.

The central hole 19 in the plug has fitted into it tightly a small air-tube 51 which extends down through the centre of the barrel 11 close to the upper end of the feed section 13. For convenience in assembling it is in the present case arranged to touch the feed section instead of being spaced slightly therefrom as it may be, but in this case the end is chamfered off at one side at 53 so that the interior of the air-tube is not closed by the contact with the feed section. A breathing or choke channel 55 is formed in the outer surface of the upper end of the tube 51 to provide a small breathing hole connecting the interior of the upper end of the barrel with the interior of the rubber bag; alternatively the channel could be formed in the interior wall of the hole 19. The cross-sectional area of the channel 55 is considerably smaller than the cross-sectional area of the interior of the air-tube, the arrangement being such that on pressure being applied suddenly to the bag 29, the air therein is expelled chiefly through the air-tube 51. Thus the air-tube is merely plugged into the barrel and can readily be removed for cleaning by pressing upwardly on its lower end.

A somewhat more simple construction is shown in Fig. 2. The barrel and feed section are as in Fig. 1. The head 25*a* is somewhat differently shaped; the rubber bag 29*a* is not attached to the plunger head 41*a* (which may be integral with the plunger 45*a*) and so has no waist 31 or nodule 33. On the other hand there is, within the cover-piece 23*a* and surrounding the bag 29*a*, a coiled spring 61 which contacts with the plug 17 and the underside of the plunger head 41*a* and tends to raise the latter.

The operation is as follows:—The cup-piece 47 is unscrewed. The feed section is dipped in ink and the rubber bag is expanded or permitted to expand by raising the cup-piece and with it the plunger and plunger head. Then the bag is collapsed by quickly lowering the cup-piece and associated parts. This drives air out of the bag through the air tube 51 (and to a small extent through the channel 55) into the barrel and thence out through the feed section. The bag is then expanded; the partial vacuum therein draws ink into the barrel and air from the upper end of the barrel leaks through the breathing channel into the bag. This operation is repeated until the barrel is full.

A still more simple construction is shown in Fig. 3. The barrel and feed section are as in Figs. 1 and 2. The plug 17*b* is formed separately from the barrel and is either cemented thereto or is screwed thereinto. There is no plunger and associated parts; the cover-piece 23*b* has a closed upper end. In operation the cover-piece is removed and the bag 29*b* is collapsed by pressing it between finger and thumb.

One advantage of these constructions is that if (as is contemplated) the barrel is moulded, then with a barrel open at both ends when made the moulding is easier than if the barrel were closed at one end. If desired, the end of the air-tube which plugs into the neck of the barrel may be enlarged so that the diameter of the hole 19 is considerably greater than the exterior diameter of that part of the air-tube which does not act as a plug. A further advantage is that no valve is required; also, the amount of mechanism required is very small. Again, the rubber bag is self-expanding and does not in its expansion need to operate any mech-

anism. Also, the few parts are easily and cheaply assembled in correct position.

Further, the arrangement is such that although the pen is valveless the air-tube does not have to be connected to the feed section as well as the upper end-wall.

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 specified which is valveless and which comprises a barrel open during manufacture at each end, a feed and feed section of usual kind connected to the barrel at the lower end, a collapsible bag attached to the upper end of the barrel, an end-wall at the upper end of the barrel dividing the barrel from the bag, a stationary air-tube inserted into an opening in the end-wall, and a breathing or choke channel that connects the bag with the upper end of the barrel, the air-tube extending down into and being always open to the lower end of the barrel (for example, having its lower end spaced from the feed section), and the cross-sectional area of the breathing channel being considerably smaller than the cross-sectional area of the interior of the air-tube in order to control the expulsion of air from the bag.

2. A pen according to Claim 1 in which the breathing channel is formed by means of a shallow recess in the outer surface of the air-tube.

3. A pen according to Claim 1 or 2 in which the lower end of the air-tube opens laterally into the barrel as well as downwardly in order that it may abut against the feed section and yet open to the barrel.

4. A pen according to Claim 1 or 2 or 3 wherein the collapsible bag is collapsed by means of a plunger which is reciprocable in a cover-piece that surrounds the bag and wherein a spring tends always to press the plunger outwardly (upwardly) to permit the bag to expand.

5. A pen according to Claim 1 or 2 or 3 wherein the collapsible bag has at its upper end a nodule that is gripped by a plunger which to collapse the bag is reciprocable in a cover-piece that surrounds the bag

6. A pen according to Claim 3 constructed, arranged and adapted to function substantially as described with reference to Fig. 3 of the accompanying drawings.

7. A pen according to Claim 4 constructed, arranged and adapted to function substantially as described with reference to Fig. 2 of the accompanying drawings.

8. A pen according to Claim 5 constructed, arranged and adapted to function substantially as described with reference to Fig. 1 of the accompanying drawings.

Dated this 30th day of May, 1935.

For the Applicants,
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75, Victoria Street, London, S.W.1,
Chartered Patent Agents.

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

FIG. 1.

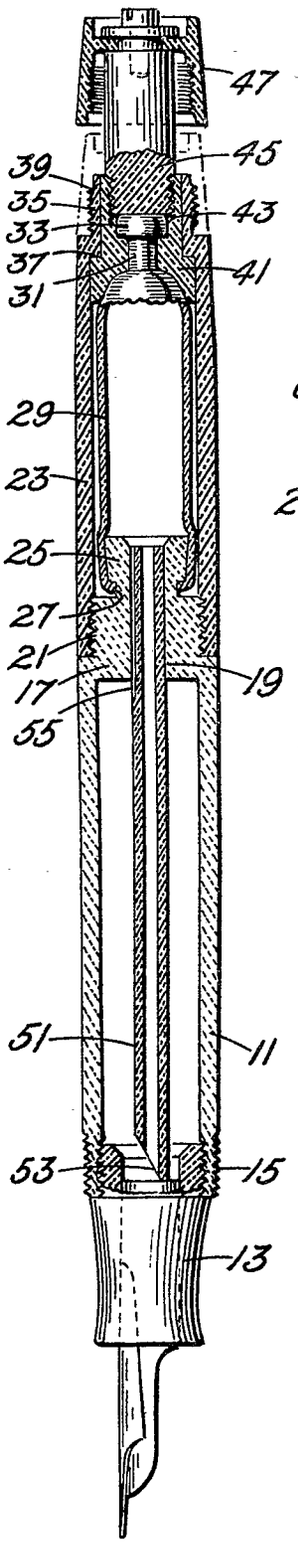


FIG. 2.

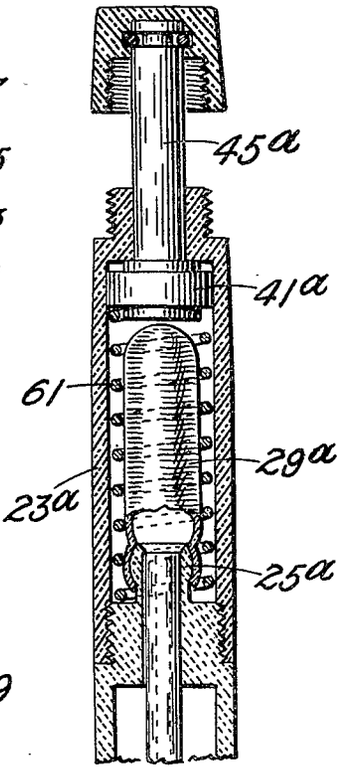
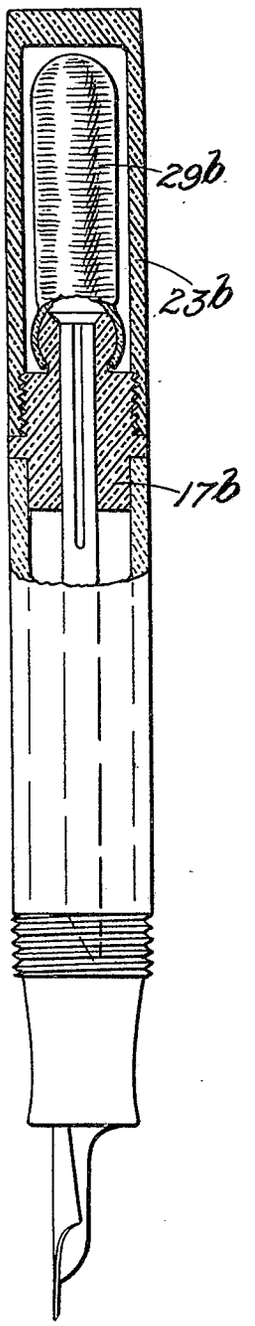


FIG. 3.



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