



Improvements in and connected with Self-filling Fountain Pens.

I, GEORGE STEWART VIVIAN, of 237, Norbury Crescent, London, S.W. 16, British Subject, and VALENTINE & SONS LIMITED, of 154, Perth Road, Dundee, British Company, 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:—

10 This invention relates to self-filling fountain pens of the type employing a reciprocating piston in the ink chamber for filling the pen. The object of our present invention is to provide an improved construction of pen of this type. A further object of the present invention is to incorporate in a fountain pen having a permanent non-removable ink chamber some of the advantages and improvements incorporated in the fountain pen having a removable ink chamber as described and claimed in our co-pending application No. 14,390/29 (Serial No. 337,794).

25 Broadly our present invention is characterised in that the reciprocating piston accommodates a relatively movable valve which during the suction movement of the piston closes a fluid passage through the piston under the influence of a spring, the influence of which is normally overcome so as to leave said passage open by a removable cap normally fitted over one end of the pen body.

35 In the preferred form of our invention the piston is located near the nib end of the pen and is adapted to be reciprocated a number of times in order to completely charge the ink chamber, the piston being connected to one end of a piston rod extending axially along the ink chamber and through a tubular guide in the upper end of the pen, this guide being formed on a hollow plug closing the upper end of the pen and accommodating a coiled compression spring adapted to raise the piston after it has been depressed by pushing down the exposed upper end of the piston rod. The lower end of the said rod passes with a clearance through the said passage in the piston and carries at its extremity the said valve. A removable cap is threaded about said plug to normally

[Price 1/-]

receive and obscure the upper end of the piston rod, and this cap when in position depresses the piston rod against the influence of the said coiled compression spring a sufficient extent to hold the valve clear of the passage in the piston to permit the column of ink above the piston to leak through it into the passage to the nib.

The present invention will be more clearly understood by reference to the accompanying sheet of drawings, wherein:—

Fig. 1 is a sectional elevation view of the pen in its normal condition.

Fig. 2 is a sectional elevation view showing the pen with the filling pump or piston depressed preparatory to a suction stroke.

Figs. 3 and 4 are detail sectional elevation views showing alternative methods of sealing the upper end of the ink chamber against leakage.

Fig. 5 is a sectional elevation showing a further sealing device and a modified arrangement of spring.

Fig. 6 is a sectional plan view of Fig. 5 on the line A—B.

Referring to the drawings the invention is shown applied to a fountain pen having a nib 1 although it will be appreciated that the nib may be substituted by a stylus. The nib 1 is shown secured by the usual securing member 2 wedged in the ink outlet passage 3 in the lower end of the body part 4 which may be of conventional exterior configuration. A protector cap 5 is preferably provided in well known manner.

The upper end of the body part 4 is normally closed by a cap 6 threaded as shown at 7 to the body part whereby it may be removed. In the lower end of the ink chamber 8 is arranged a pump chamber 9.

The ink chamber is provided with an appropriate device for drawing ink into the lower end 9 so as to charge the ink chamber, and the filling device is at the lower end of the chamber 8 and in the form of a reciprocating bucket type of pump 12 connected to an operating rod 13.

The pump member 12 operates between

55

60

65

70

75

80

85

90

95

100

105

the lower end of the pump chamber 9 and an annular abutment 14 a short distance above such lower end, whereby a number of reciprocations have to be imparted to the member 12 to properly charge the chamber 8 with ink.

A simple method of effecting the desired reciprocation of the pump member 12 consists in extending the upper end of the rod 13, preferably enlarged as a handle 12a, through the sealed upper end of the chamber 8, a coiled compression spring 15 being provided for raising the rod 13, the depression of such rod being effected by hand. The spring 15 can conveniently be accommodated in a plug 16 permanently closing the upper end of the chamber 8, the spring 15 being held between the base of this plug 16 and the lower end of the handle 12a. It is preferred to guide the rod 13 through a sleeve 17 fixed in the base of the plug 16 and fairly tightly fitted about the rod 13 to prevent ink from flowing into the plug 16.

To obviate a delicate and complicated valve mechanism in the pump chamber 9, the necessary valve action for transferring the ink from the pump chamber 9 to the space above the abutment 14 can be obtained by providing on the lower end of the rod 13 a valve member 21, this member 21 being fixed to the rod 13 and having a small amount of lost motion relative to the pump member 12. A port 22 is provided in the top face of the member 12, this member being a shallow hollow cylindrical metal or other suitable member preferably having a number of slits 12b in its lower end to provide a certain amount of resiliency whereby it may be tightly fitted in the lower end of the chamber 9 and normally will by reason of such tight fit remain abutting against the abutment 14 so as to leave a clear passage for the ink through a hole 14a in the abutment 14, the port 22 and the open base 23 of the piston 12.

The valve member 21 has a spherical or conical upper end 21a adapted to engage and close the port 22 during the rise of the piston 12, but normally clearing the port 22 as shown in Fig. 1 to allow the ink to flow freely from the ink chamber 8. The base of the valve member 21 which comprises a cross bar or spider arm does not close the base of the piston 12 but engages an annular ledge 21b of such base.

Any suitable air vent may be provided for the escape of air from the chamber 8 due to the rise of ink in the chamber 8.

The pen is charged with ink by engaging the head 12a which is depressed successively, the actuation of the head 12a

being conveniently effected by the operator's thumb. When the chamber 8 is charged the cap 6 is screwed on again. When the cap 6 is screwed home its upper end abuts against the head 12a of the rod 13 and slightly depresses such rod, thereby uncovering the port 22 in the piston 12 without moving the piston.

If desired the upper end of the chamber 8 can be fitted with a rubber cap to prevent leakage of ink, for instance as shown in Fig. 3 in which a rubber cap 24 has a beaded rim 25 gripped in a circumferential recess 26 in the top of the chamber 8, this cap being stretched over the upper end of the head 12a of the rod 13 when the rod is in the normal position. As an alternative or additional sealing means the tubular guide 17 of the rod 13 may be fitted with a rubber tube 27 as shown in Fig. 4 this tube being tightly gripped around the guide 17 and the rod 13 and being shaped to permit the rod 13 to reciprocate. As shown in Fig. 4 the guide 17 can be formed with a flange 17a abutting against an annular ledge 28 in the chamber 8, the spring 15 being accommodated in a space 15a formed in the chamber 8 instead of fitting a separate plug 16.

It will be appreciated that the spring 15 may be located elsewhere, for instance between the base of the piston 12 and the lower end of the chamber 8.

In the arrangement shown in Figs. 5 and 6 the pump 12 is connected to the plug 16 by a tube 13a which surrounds the rod 13. The lower end of the tube 13a is fitted into the annular abutment 14 and its upper end is fitted into the plug 16. Vent holes 13b are provided near the upper end of the tube 13a and perforations 14b are formed in the annular abutment 14 around the tube 13a. A resilient diaphragm 30 of rubber or other suitable material is clamped between nuts 31 on the screw threaded upper end of the rod 13. The plug 16 is formed in two portions 16a and 16b and the outer edges of the diaphragm 30 are clamped between them. The diaphragm 30 may act as a spring to return the pump member 12 and handle 12a or an additional spring 15b may be arranged in the pump chamber 9 or in any other convenient position. An air escape vent passes through the plug 16 from its centre 16c beneath the diaphragm 30.

The vent holes 13b are formed to facilitate the filling of the ink chamber 8 until the holes are covered by the ink when further pumping will not be effective. They also ensure an unrestricted flow of ink to the pen when in use. The resilient diaphragm forms an effective

seal for the top of the ink chamber 8 and prevents the escape of ink.

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:—

10 1. A self-filling fountain pen characterised in that the reciprocating piston accommodates a relatively movable valve which during the suction movement of the piston closes a fluid passage through the piston under the influence of a spring, the influence of which is normally over-
15 come so as to leave said passage open by a removable cap normally fitted over one end of the pen body.

20 2. A self-filling fountain pen according to claim 1 wherein said piston has a short stroke of movement relative to the ink chamber and is adapted to be reciprocated a number of times to charge the said chamber and by such reciprocation to build up a column of ink above it.

25 3. A self-filling fountain pen according to claim 1 or 2 wherein said valve constitutes an abutment for engaging the piston for imparting sliding movement thereto and being adapted to cover and
30 uncover a port in the upper side of the piston communicating with the interior of the ink chamber, the upper end of the piston rod projecting beyond the closed upper end of the ink chamber and normally engaged by a cap closing the upper
35 end of the outer body part, the length of the rod being such that by reason of such engagement the said valve is held clear of the said port.

40 4. A self-filling fountain-pen according

to claim 1, 2 or 3, wherein the said piston operates between the lower end of the ink chamber and an abutment a short distance above the lower end of the ink chamber.

45 5. A fountain pen according to claim 3 or 4 wherein the said piston rod slides through a tubular guide secured on the base of a compartment in the upper end of the ink chamber, said compartment
50 accommodating a coiled compression spring acting on the said rod.

6. A fountain pen according to claim 3, 4 or 5 wherein a rubber liquid sealing device is provided with the upper end of
55 the rod of the reciprocating pump member to prevent leakage of ink at the upper end of the ink chamber.

7. A fountain pen according to claim 6 in which said sealing device comprises
60 a rubber cap fitted over the upper ends of the ink chamber and the said rod.

8. A fountain pen according to claim 6 wherein said sealing device comprises a
65 rubber tube fitted over said tubular guide and the said rod.

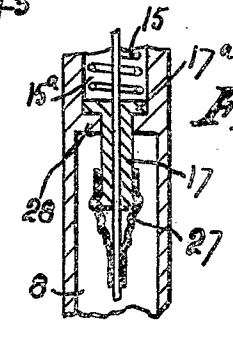
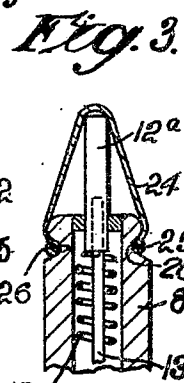
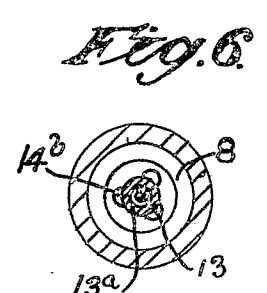
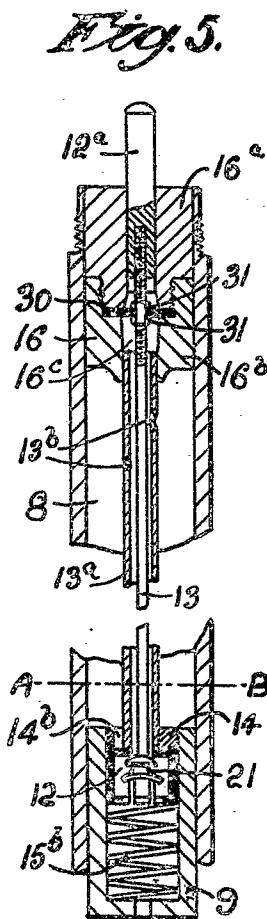
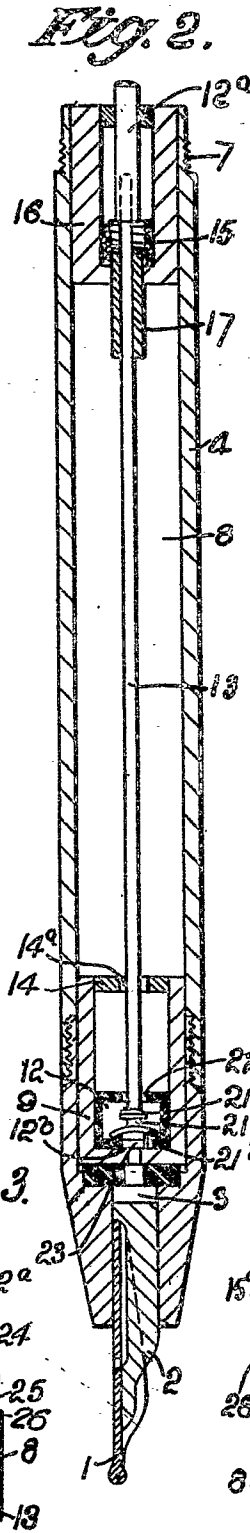
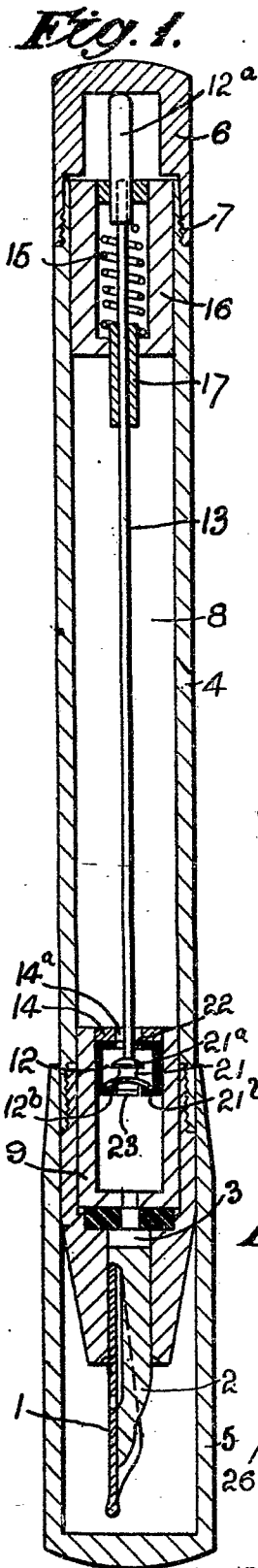
9. A self-filling fountain pen according to claim 4 wherein a tube extends
70 upwards from said abutment and has an air escape aperture, the interior of the tube communicating with an air vent in the upper end of the pen body.

10. A self-filling fountain pen substantially as described with reference to the
75 accompanying drawings.

Dated this 1st day of February, 1930.

RAYNER & Co.,

5, Chancery Lane, London, W.C. 2,
Agents for the Applicants.



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