



Application Date: May 8, 1929. No. 14,390 / 29.

**337,794**

Complete Accepted: Nov. 10, 1930.

COMPLETE SPECIFICATION.

**Improvements in and connected with Fountain Pens.**

We, 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 fountain pens. Heretofore it has been proposed to employ a detachable ink receiving chamber with a fountain pen but the filling end of this chamber is located outside the pen body

15 which would result in leaving an undesirable residue of ink around the exterior of the pen which is the objection of existing fountain pens not having removable ink chambers. The object of my present invention is to provide a fountain pen with

20 a detachable ink chamber which will not have this disadvantage. A further object of the present invention is to provide a clean and easy method of charging the ink chamber of a fountain pen and also

25 to enable a good supply of ink to be received in such chamber. According to the present invention a fountain pen having a readily detachable

30 ink chamber is characterised in that the said chamber when accommodated in the pen has an ink outlet passage terminating at its delivery end inside the body of the pen and communicating with the ink passage

35 in one end of the body of the pen accommodating the usual nib or stylus whereby the ink flows from the detachable chamber into the nib or stylus in the normal manner.

40 Means is preferably provided whereby the complete insertion of the ink chamber in the pen will cause the ink outlet of such chamber to be brought into communication with the nib or stylus passage.

45 In one form of this invention a fountain pen comprises two tubular parts, one being the outer and normal nib or the like carrying part preferably provided with the usual nib cap, and the other having a

50 nice fit in said outer part and adapted to extend substantially the full length of the interior of the outer part, the inner part being provided with an ink outlet at its lower end and accommodating suitable means, for instance a bucket form of reciprocating plunger pump similar to that described in our co-pending specification No. 3471/30 (Serial No. 337,835) for drawing ink through such outlet, the outlet being provided with a non-return valve co-operating with the pump device and adapted to be opened and retained open when the inner tubular part is in its normal position inside the outer sleeve.

55 It is preferred to make the inner tubular member of glass or other suitable transparent material to provide a visual means of ascertaining when the ink chamber is adequately filled.

60 In order that our invention may be clearly understood and readily carried into effect we have appended hereto a sheet of drawings illustrating an embodiment of same, and wherein:—

65 Fig. 1 is a sectional elevation of the assembled pen.

70 Figs. 2 and 3 are sectional elevation views of the ink chamber showing the two extreme positions of the reciprocating pump-like filling device.

75 Figs. 4 and 5 are detail sectional elevation views showing alternative methods of sealing the upper end of the ink chamber against leakage of ink.

80 Figs. 6 and 7 illustrate another arrangement.

85 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.

90 A protector cap 5 is preferably provided in well known manner.

95 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 to enable an ink receiving chamber inside the tubular body part 4 to be removed.

100 The ink receiving chamber is a tubular body 8 extending as a nice fit the full length of the interior of the body part

105

[Price 1/-]

Price 2/7

4 and projecting a slight distance beyond the upper end of the body part 4 whereby it may be engaged for withdrawing from the body part 4. In the lower end of the tubular ink chamber 8 is arranged a pump chamber 9 having a conical end and it is preferred to provide a rubber seating 10 against which the conical lower end of the ink chamber 8 is pressed by reason of the engagement of the upper end of the ink chamber with an annular step 11 in the closure cap 6, thereby obviating loose parts.

The detachable 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 may be of any suitable form, one form being that illustrated in which the pump chamber 9 at the lower end of the chamber 8 accommodates a reciprocating bucket type of pump 12 connected to an operating rod 13.

The pump member 12 operates between 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.

The conical lower end of the chamber 8 accommodates a loose ball valve 18 which co-operates with the pump member 12 in well known manner and when the pumping operation is finished closes the ink outlet 19 in the lower extremity of the chamber 8, whereby the ink is retained in the chamber 8 whilst re-introducing the chamber 8 in the body part 4. The opening of the passage 19 when the chamber 8 is properly introduced into the body part 4 can be effected by providing on the axis of the body part 4 a pin 20 fixed in the inner end of the nib holder 2 and adapted to enter the passage 19 as shown in Fig. 1, the pin 20 engaging the ball 18 and holding it clear of the apex of the conical part 9.

In a stylograph the stylus is carried into the opening 19.

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. It is preferred to make the tube forming the chamber 8 of glass, celluloid or other suitable transparent material to give a visible indication when the chamber is properly charged.

The pen is charged with ink by unscrewing the cap 6 and withdrawing the chamber 8, when the lower end of the chamber 8 is inserted into an ink vessel and the head 12a depressed successively, the actuation of the head 12a being conveniently effected by the operator's thumb. When the chamber 8 is charged it is inserted into the body part 4 and 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. 4 in which a rubber cap 24 has a beaded rim 25 gripped in a circumferential recess 26 in the top of the

tube 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. 5, 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. 5 the guide 17 can be formed with a flange 17a abutting against an annular ledge 28 in the tube 8, the spring 15 being accommodated in a space 15a formed in the tube 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 tube 8.

In the arrangement shown in Figs. 6 and 7 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.

By means of our present invention a clean and efficient method of charging a fountain pen with a large supply of ink is provided.

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 fountain pen having an ink receiving chamber readily detachable from the remainder of the pen characterised in

that the said chamber when accommodated in the pen has an ink outlet passage terminating at its delivery end inside the body of the pen and communicating with the ink passage in one end of the body of the pen accommodating the usual nib or stylus whereby the ink flows from the detachable chamber into the nib or stylus in the normal manner.

(2) A fountain pen according to claim 1 in which the ink chamber is provided with a substantially conical lower end adapted to be pressed against a seating in the lower end of the outer body part, such conical lower end having an ink outlet passage.

(3) A fountain pen according to claim 1 or 2 wherein the lower end of the said ink chamber accommodates a valve adapted to close the ink outlet passage when inserting the ink chamber into the outer body part, but adapted to be engaged by a projection in the outer body part so as to be opened when the ink chamber is fully introduced into the outer body part.

(4) A fountain pen according to claim 1 or 2 wherein the ink chamber is a tubular body accommodating a reciprocating pump member for charging the ink chamber and having 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.

(5) A fountain pen according to claim 4 wherein said reciprocating pump member is a hollow piston accommodating a relatively movable valve attached to the lower end of a rod, said valve constituting an abutment for engaging the piston for imparting sliding movement thereto and being adapted to cover and 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 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.

(6) A fountain pen according to claim 4 or 5, wherein the said reciprocating pump member or piston operates between the lower end of the ink chamber and an abutment a short distance above the lower end of the ink chamber.

(7) A fountain pen according to claim 5 or 6 in which the reciprocating pump member rod slides through a tubular guide secured on the base of a compartment in the upper end

70

75

80

85

90

95

100

105

110

115

120

125

130

of the ink chamber, said compartment accommodating a coiled compression spring acting on the said rod.

5 (8) A fountain pen according to claim 5, 6 or 7 inclusive wherein a rubber liquid sealing device is provided with the upper end of the rod of the reciprocating pump member to prevent leakage of ink at the upper end of the ink chamber.

10 (9) A fountain pen according to claim 8 wherein said sealing device comprises a rubber cap fitted over the upper ends of the ink chamber and the said rod.

15 (10) A fountain pen according to claims 8 and 9 wherein said sealing device comprises a rubber tube fitted over said tubular guide and the said rod.

(11) A fountain pen according to claim 3 wherein the member securing the nib of the pin in the usual ink outlet passage has an upstanding pin adapted to enter the ink outlet of the ink chamber and to engage and raise a ball valve in the lower end of the ink chamber. 20

(12) A self-filling fountain pen with a detachable ink chamber substantially as described with reference to the accompanying drawings. 25

Dated this 8th day of May, 1929.

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.]

