

PATENT SPECIFICATION



Application Date: Sept. 16, 1922. No. 25,092/22.

207,904

Complete Left: June 18, 1923.

Complete Accepted: Dec. 13, 1923.

PROVISIONAL SPECIFICATION.

Improvements in, or relating to Fountain Pens.

I, HERBERT GORNELL, 46, London Road, Twickenham, Middlesex, British subject, do hereby declare the nature of this invention to be as follows:—

5 My invention relates to writing instruments of the type in which a reservoir, or ink container, is provided for the purpose of supplying a quantity of ink to the nib sufficient to enable a great
10 quantity of writing to be done without the use of an ink-pot or similar ink containing receptacle.

Such a writing instrument is known as a fountain pen, or reservoir pen. A
15 fountain pen in which the nib is caused to disappear inside the reservoir, or ink container, when not in use, is known as a safety fountain-pen.

The purpose of my invention is to provide
20 a simple and efficient means for replenishing the supply of ink in the reservoir or ink container of either a fountain pen or a safety fountain pen, such means being permanently attached
25 to said pen.

A fountain-pen equipped with such a means is known as a self-filling fountain-pen; a safety fountain-pen equipped with such a means is therefore a self-filling
30 safety fountain-pen.

Furthermore, the purpose of my invention is to provide a simple and efficient contrivance which can be made independently of any fountain-pen, and by
35 being readily attached to the said fountain-pen will transform it into a self-filling fountain-pen.

My invention consists of a cylindrical tube having a smooth and true bore, in
40 which an airtight plunger or piston is able to travel when required to do so, this cylindrical tube is increased near one end of its outside diameter so as to be able to permit of its fastening either
45 by screwing, friction or an airtight joint into the interior of the pen body, or

barrel, at the end which is situated opposite the nib end of said pen barrel; the cylindrical tube, when fastened will project inwards in the reservoir when
50 seen from such end.

Beyond the increase in diameter just described is a further increase, this further increase, by providing a shoulder,
55 prevents the cylindrical tube from falling inside the pen reservoir, and also provides convenient finger hold when fastening the cylindrical tube to the pen body.

This further increase is exposed to view and extends outwards for a short
60 distance from the end of the pen barrel opposite the nib end, and appears as the continuation of it. The end of the further increase constitutes the end of the cylindrical tube. Both ends of the
65 cylindrical tube are sealed by packing material to make them airtight, whilst allowing the passage of a piston-rod, to which piston-rod the plunger or piston
70 is attached.

It will now be necessary to make use of the expressions "above the piston" and "below the piston."

The expression "above the piston" means the space inside the cylindrical
75 tube which extends from the piston to the end opposite the nib end of the pen-body. The expression "below the piston" means the space inside the
80 cylindrical tube which extends from the piston to the end of the cylindrical tube which is nearer to the nib end of the pen-body.

The portion of the piston rod situated above the piston is extended sufficiently
85 for it to carry a head of larger diameter, the purpose of this head being to secure a convenient hold of the piston rod when manipulating it, and its being securely
90 fastened when in its normal resting position.

[Price 1/-]

This head, when in the normal resting position extends from the end of the further increase of the cylindrical tube, and fastens thereon, either by screwing friction, or otherwise. The end of this head constitutes the end proper of the pen-body opposite the nib end; it can also be so shaped on its outside diameter so as to receive the cap of the pen when the nib is exposed for writing.

The outside diameter of the cylindrical tube projecting inwards is smaller than the inside diameter of the reservoir or ink container, and the capacity of the cylinder is equal to the capacity of the reservoir. At the extreme end of the cylindrical tube, and just below the sealed end above the piston, is a hole through the wall of the cylindrical tube, this hole thus establishing communication between the interior of the cylindrical tube above the piston and the reservoir, or ink container.

Thus any movement imparted to the piston through the head and piston rod, will displace a quantity of fluid above the piston, and in turn an equivalent quantity of fluid in the reservoir, therefore an upward movement of the piston will expel fluid from the reservoir, and downward movement of the piston will cause a sucking in of fluid.

Below the piston, I drill a hole extending right through the central axis of the piston rod, communicating with a transversal hole opening below the piston) and ending at the end of the head so as to establish communication between the outside air and the space below the piston.

When the piston moves upwards expelling a volume of fluid from the interior of the cylindrical tube into the reservoir, in turn expelling a similar volume of fluid from the reservoir into the outside air, a quantity of outside air also enters through the hole extending through the piston-rod and passes into the space below the piston; this air is again expelled into the outside air when the piston travels in a downward direction.

The purpose of this is to prevent a vacuum being formed below the piston, which vacuum, if imperfect would admit a certain proportion of outside air, causing a resistance to the working of the piston when travelling downwards.

The part of the piston-rod situated below the piston is made sufficiently long to bear upon the ink conductor or feed and seal it when the head is fastened on the end of the cylindrical tube, thus preventing any escape or leakage of ink when the pen is not in use. The manipulating of a fountain pen made self-

filling by the application of my invention is thus

1. FOR WRITING:

Unscrew or release the head sufficiently to allow a suitable flow of ink from the reservoir to the nib. 70

2. FOR STORING AWAY:

Rescrew or fasten the head so as to seal the ink conductor or feed, thus shutting off the supply of ink to the nib. 75

3. FOR FILLING:

Unscrew or release the head until it allows the piston rod to be pulled out; pull the piston rod out, holding nib end of pen over an ink pot or the like; immerse nib fully in ink, push back head, rescrew, and the pen is filled and sealed. 80

In a pen of the safety type, the filling operation can be performed either when the nib is withdrawn inside the reservoir, or when it is fully out; the advantage of filling when the nib is withdrawn being obvious owing to preventing any damage to the nib during the filling operation. 85 90

By introducing minor modifications, necessary for the purpose in view, my invention as afore explained can be embodied in fountain pens of the type in which the nib is caused to disappear inside the reservoir or ink container when not in use. 95

Such pen, a safety pen, will therefore, with the addition of my invention be a self-filling safety fountain pen. 100

My invention, as applied to a safety fountain pen consists of:

A pen barrel, or reservoir.

A cylindrical tube, having a smooth and true bore, in which an airtight plunger, or piston is able to travel when required to do so, thus being identical in function to the cylindrical tube as attached to a self-filling fountain pen, as afore described, but being slightly modified on its external diameter so as to provide a different fastening to the pen-barrel, the purpose of this being full-explained later on. 105 110

A fixing collar.

A propelling collar. 115

In the pen-barrel, from the end that is furthest away from the nib end, I drill a longitudinal hole of a given diameter extending for a suitable distance towards the nib end of the pen-barrel this hole continues towards the nib end of the pen barrel into a second hole of lesser diameter than the first and then continues into a third hole of still less diameter, which third hole passes through 120 125

the nib end of the pen barrel. At one end of its outside diameter, the cylindrical tube is continued into a shell, or sleeve, through the wall of which a spiral slot of suitable length is cut; in the second hole of lesser diameter that I have bored in the pen-barrel, I cut a longitudinal groove of the same length as the spiral slot just referred to. Near its other end, the cylindrical tube is slightly reduced on its outside diameter for a short distance, and from there again reduced to the end. Over the slight reduction in diameter just mentioned I slip a fixing collar of equal length, this collar being suitably recessed so as to be able to contain suitable packing to prevent any escape of fluid between the two surfaces in contact, whilst allowing the parts to rotate relatively to one another. Over the other reduced portion of the cylindrical tube I fix a propelling collar either by friction, screwing, or otherwise, this propelling collar is therefore fixed securely to the cylindrical tube and rotates with it. The end of the propelling collar is extended slightly beyond the end of the cylindrical tube, so as to accommodate the head of the piston rod, which can fasten there on either by screwing, friction or otherwise.

Through the spiral slot in the shell or sleeve, I insert a propelling pin, which pin fits at one end into a feed rod, or nib carrier sliding to and fro in the interior of the sleeve.

I now insert the cylindrical tube, with its additional parts, *i.e.* nib carrier and sleeve at one end, fixing collar and propelling collar at the other, into the pen-barrel, so that the other end of the propelling pin fits into the longitudinal groove of the second hole of lesser diameter in the pen barrel, and so that the fixing collar is able to fasten either by screwing friction or otherwise on to the end of the pen barrel that is furthest away from the nib end.

The pen is now permanently assembled, and is ready to function. By rotating the propelling collar in one direction or the other, according to the

direction of the spiral slot in the sleeve, the cylindrical tube will be caused to revolve inside the fixing collar; and to transmit its rotary motion to the sleeve by means of the spiral slot therein, in which the propelling pin is fixed to the feed rod at one end, whilst its other end engages the longitudinal groove of the barrel, the rotary motion imparted to the cylindrical tube is transformed thereinto linear motion, causing the nib-carrier to be sent forward until its face is pressed against the inner face of the nib end of the pen barrel; in doing this the nib, is passing through the third hole of the pen-barrel, has become exposed for the writing position, and the ink is supplied to it by means of small channels in the feed-rod. Reverse motion imparted to the propelling collar will cause the nib to be retracted to the interior of the pen-barrel; a sealing cap is then screwed over the nib end of the pen-barrel to make it leak-proof when the pen is not in use; when the pen is in use, this cap can be fitted on the outside diameter of the propelling collar, and hold thereon by either screwing, friction, or otherwise.

The propelling motion and function of the pen in this respect are therefore identical to those of the pens known as safety pens, but in addition the self-filling feature, exactly similar to the self-filling feature, as described before in conjunction with the self-filling fountain pen, is embodied; in the safety pen the piston-rod does not extend below the piston so as to seal the ink conductor or feed; as owing to the construction and conception of the pen this is not practicable and the sealing cap makes the pen leak-proof.

Obviously, the details of the invention can be varied without departing from the spirit of the invention, and the particular construction described is set forth by way of example, only, and not by way of limitation.

Dated the 14th day of September, 1922.

HERBERT GORNELL.

COMPLETE SPECIFICATION.

Improvements in, or relating to Fountain Pens.

I, HERBERT GORNELL, a British subject, of 46, London Road, Twickenham, Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particu-

larly described and ascertained in and by the following statement:—

This invention relates to fountain pens, and refers more particularly to fountain pens having filling means incorporated

55

60

65

70

75

80

85

90

95

100

105

110

in the structure thereof so that the usual filling squirt or syringe may be dispensed with, and also including a safety mechanism by which the nib may be withdrawn to a protected position within the body of the pen when the same is not in use.

The object of the invention is the provision of an improved pen of this kind and the invention may be said to consist broadly of a fountain pen having incorporated in the structure thereof within the body of the pen a longitudinal cylinder in which a piston is adapted to slide for the purpose of drawing in ink and charging the pen, and an operative connection between said cylinder and the nib of the pen such that rotation of said cylinder within the pen in reverse directions respectively effects the withdrawal of the nib from its operative position to a position within the body of the pen and the return of said nib to its operative position.

An embodiment of the invention is illustrated in the accompanying drawing and the same will now be described, it being understood that the particular construction illustrated is susceptible of various modifications without departing from the scope of the appended claims.

Referring to the drawing the same illustrates in sectional elevation a fountain pen of which 1 is the main body or barrel 1a is the usual end cap and 2 is the nib. The said main body or barrel is constructed with an open end at the end remote from the nib and this open end is closed by means of the cooperation of a fixing collar 24 screwed therewithin and a closed hollow cylinder 4 mounted at one end within said fixing collar and extending longitudinally within said barrel as shown. The said cylinder 4 is mounted in the fixing collar 24 so as to be rotatable therewithin but not movable axially thereof, an annulus 5 being provided for preventing axial movement in one direction, and cooperating shoulders at 25 on the cylinder 4 & fixing collar 24 respectively being formed to prevent axial movement in the other direction. A packing ring 26 renders fluid tight the bearing between the cylinder & fixing collar. The annulus 5 & the outer surface of the fixing collar 24 are of the same diameter as is the barrel 1 and form virtually a continuation thereof. The hollow cylinder is of such diameter that an annular clearance 8 is left between the same and the internal periphery of the barrel. The annulus 5 may of course be secured to the cylinder 4 in any desired manner, either by friction or rivetting or screwing.

Passing axially through the cylinder 4 is a piston rod 9, said piston rod forming a sliding fluid tight joint with the outer end of the cylinder by virtue of suitable packing 11; and this piston rod bears the piston 13 in response to the sliding of which within the cylinder 4 the ink is adapted to be drawn into the pen. The piston rod terminates at the exposed end in an operating knob or handle 14 (which is of the same diameter as the end of the annulus 5 and is adapted to be screwed into engagement therewith).

At or near to the end of the cylinder 4 remote from the nib, said cylinder is afforded communication with the surrounding annular space 8 by means of a small orifice 16 and the portion of the cylinder to the nib side of the piston is afforded communication with the atmosphere (the cap 1a having the usual ventilation holes) by means of a passage 17 passing longitudinally through the piston rod and operating handle in the manner shown.

The whole of the space within the barrel outside of the closed cylinder 4 is preferably of the same or substantially the same volume as is the interior of said closed cylinder 4.

From the above, the operation of the device in respect of its filling function should be obvious:—Thus, supposing the pen is empty and it is desired to fill it, the operating handle 14 is unscrewed from the annulus 5 and is drawn, together with the piston 13, outwardly to the extreme end of its stroke remote from the nib. This has the effect of forcing the air which was within the cylinder through the orifice 16 and in to the remainder of the interior of the pen barrel, with the result that the air which was in the barrel, together with any remaining drops of ink, is forced out through the nib end of the pen. The nib end of the pen is then dipped into an ink well and the operating handle 14 is depressed together with the piston 13 to the extreme end of its stroke nearest to the nib; and this last operation has the effect of sucking air back from the barrel interior through the orifice 16 into the cylinder 4, and therefore of sucking ink from the ink well through the nib and into the interior of the barrel. Then by screwing the operating knob into engagement with the annulus 5, the position of the piston is maintained.

The part played by the passage 17 during this operation is that of obviating the necessity of creating compression or suction within the part of the cylinder on the nib side of the piston as would

obviously be the case if this part of the cylinder were completely closed.

5 Describing now the means by which the nib is adapted to be withdrawn to and returned from a protected position within the pen, a sheath 18 is provided extending integrally from the cylinder 4 and within said sheath 18 the bearing end 19 of the nib feed rod 20 is adapted to reciprocate. In the inner periphery of the pen barrel 1 adjacent this sheath 18 is cut a longitudinal groove 21, and a helical slot 22 of the same projected length is cut in the sheath 18. A transverse pin 23 passes from the groove 21 through the slot 22 to the interior of the sheath 18 where it is rigidly secured to the bearing end 19 of the feed rod.

20 Thus when the cylinder 4 is rotated the feed rod 20 will be slidden longitudinally in one direction or the other according to the direction of rotation of the feed rod.

25 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A fountain pen having incorporated in the structure thereof within the body

of the pen a longitudinal cylinder in which a piston is adapted to slide for the purpose of drawing in ink and charging the pen, and an operative connection between said cylinder and the nib of the pen such that rotation of said cylinder within the pen in reverse directions respectively effects the withdrawal of the nib from its operative position to a position within the body of the pen and the return of said nib to its operative position. 30 35 40

2. A fountain pen according to Claim 1 wherein said connection comprises a cylindrical shell integral in one structure with, and extending coaxially from said longitudinal cylinder, and having a helical slot cut therein, and a projection attached to the nib feed and engaging in said slot. 45 50

3. A fountain pen substantially as herein specified with reference to the accompanying drawings. 50

Dated this 18th day of June, 1923.

A. A. THORNTON,
Chartered Patent Agent,
Quality Court, Chancery Lane, London,
W.C. 2,
For the Applicant. 55

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

