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COMPLETE SPECIFICATION:

"An Improvement in Fountain-pens."

I, WILLIAM IRVING FERRIS of 173, Broadway, New York City, United States of America, Pen Manufacturer; 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.

5 My invention relates to improvements in those fountain pens which are provided with a filling device permanently attached to and forming a part of the pen, and my invention consists in the combination with a pumping device consisting of a piston and valve situated within the top or rear end of the pen-holder, and a tightly-fitting removable cap for the rear end of the pen-holder, of a perforated diaphragm within the reservoir located somewhat below
10 the pumping device and serving to prevent access of ink to the pumping device during the pumping operation.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a pen provided with the improvements of this invention. Figure 2 is an enlarged horizontal sectional view on the line $x-x$ of Figure 1. Figure 3 is an enlarged horizontal sectional view on the line $y-y$ of Figure 1. Figure 4 is an enlarged horizontal sectional view on the line $z-z$ of Figure 1.

A is the ink reservoir within the pen-holder; B the nib; C the ordinary cap to cover the pen point; H is the piston adapted to fit within the pen-holder, said piston having a conical hole n , which a ball p (ordinarily about
20 the size of a No. 8 shot) fits and closes.

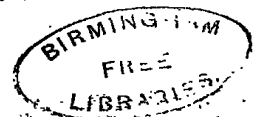
A weight w is preferably attached to the ball p below the hole n in the manner shown, which weight assists in keeping the ball p in its proper place. The hole n and ball p constitute a simple valve. The piston is operated by a
25 handle J attached to the piston by the pivot K and attached at the other end to a cap L which screws into, or otherwise tightly fits, and serves as a closure for the upper end of the pen-holder. The cap L is thus not only a cap to close the pen-holder when full, but also preferably forms a part of the piston rod.

R is the perforated diaphragm permanently located within the reservoir and preferably at a point just clear of the lower extremity of the stroke of the piston H and associated parts as shown in the drawing in Figure 1.

As shewn in Figures 1 and 4 of the drawings, this diaphragm R consists of a disc perforated by a number of holes of such a size as to be adapted to permit the passage of the air escaping from the bubbles which come in contact with
35 its lower face during the filling operation, but to arrest the ink drawn up therewith until the reservoir is full up to that point. Thus this breaking of the air bubbles enables the operator to fill the reservoir more readily and completely and serves to prevent ink from passing up through the valve with the air until the reservoir is completely filled.

40 The pen has an opening at the lower end, through which the ink is pumped and which should be somewhat contracted in relation to the diameter of the reservoir. This may be accomplished in many ways, as for example by contracting the lower end of the reservoir, or by partly filling it with the pen, feed-bar or other pieces. As shewn in the drawings, the feed-bar N entirely
45 fills the lower end of the pen-holder O except for the feed channel M. If there be more than one opening into the reservoir from the lower end, the sum

[Price 8d.]



Ferris's Improvement in Fountain-pens.

of the areas of such openings should be less than the circular section of the reservoir and preferably not larger than the area of the conical hole *n*.

The operation is as follows:—When the pen-holder is empty the cap *L* is unscrewed, the lower end of the pen *B* and the feed-bar *N* is dipped into the ink bottle and the piston *H* worked up and down with a number of short quick strokes until the ink appears above the piston *H* when the cap *L* is again screwed on. 5

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is. 10

In a fountain-pen the combination with a pumping device for filling the pen, consisting of a piston and valve and a tightly-fitting removable cap, of a perforated diaphragm located somewhat below the pumping device and serving to prevent access of ink to the said device during the pumping operation substantially as described and shewn in the drawings. 15

Dated this 27th day of January 1909.

A. M. & WM. CLARK,
Chartered Patent Agents,
53, Chancery Lane, London.

Fig. 1.

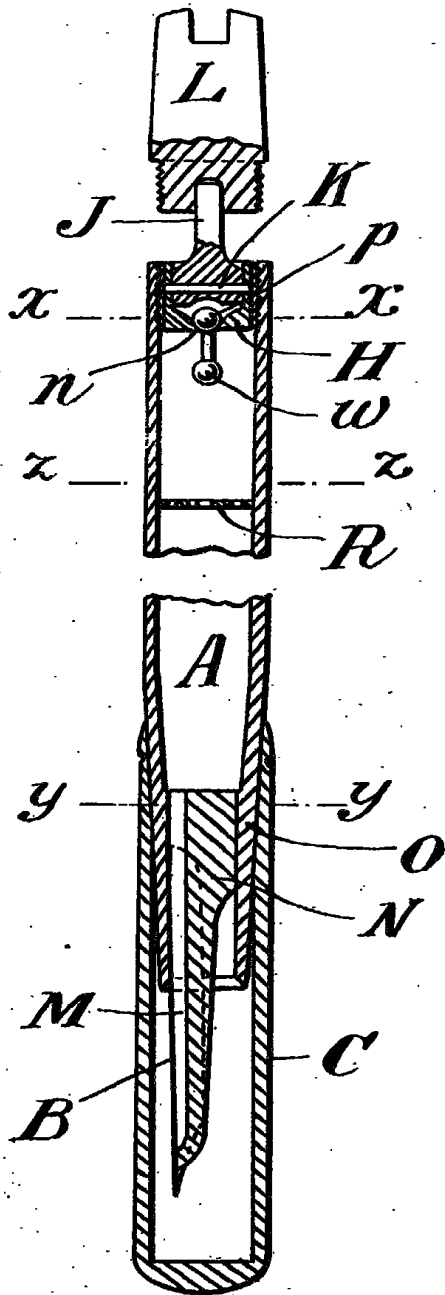


Fig. 2.

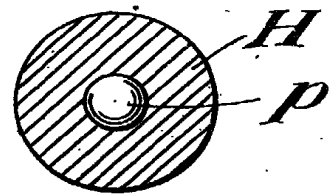


Fig. 3.

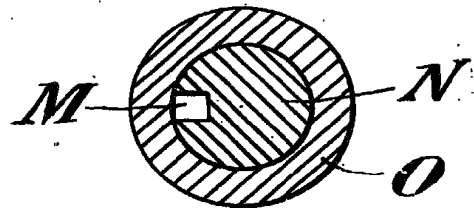
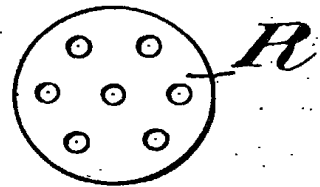


Fig. 4.



[This Drawing is a full-size reproduction of the Original.]

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