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R. A. HAMILTON.

FOUNTAIN PEN.

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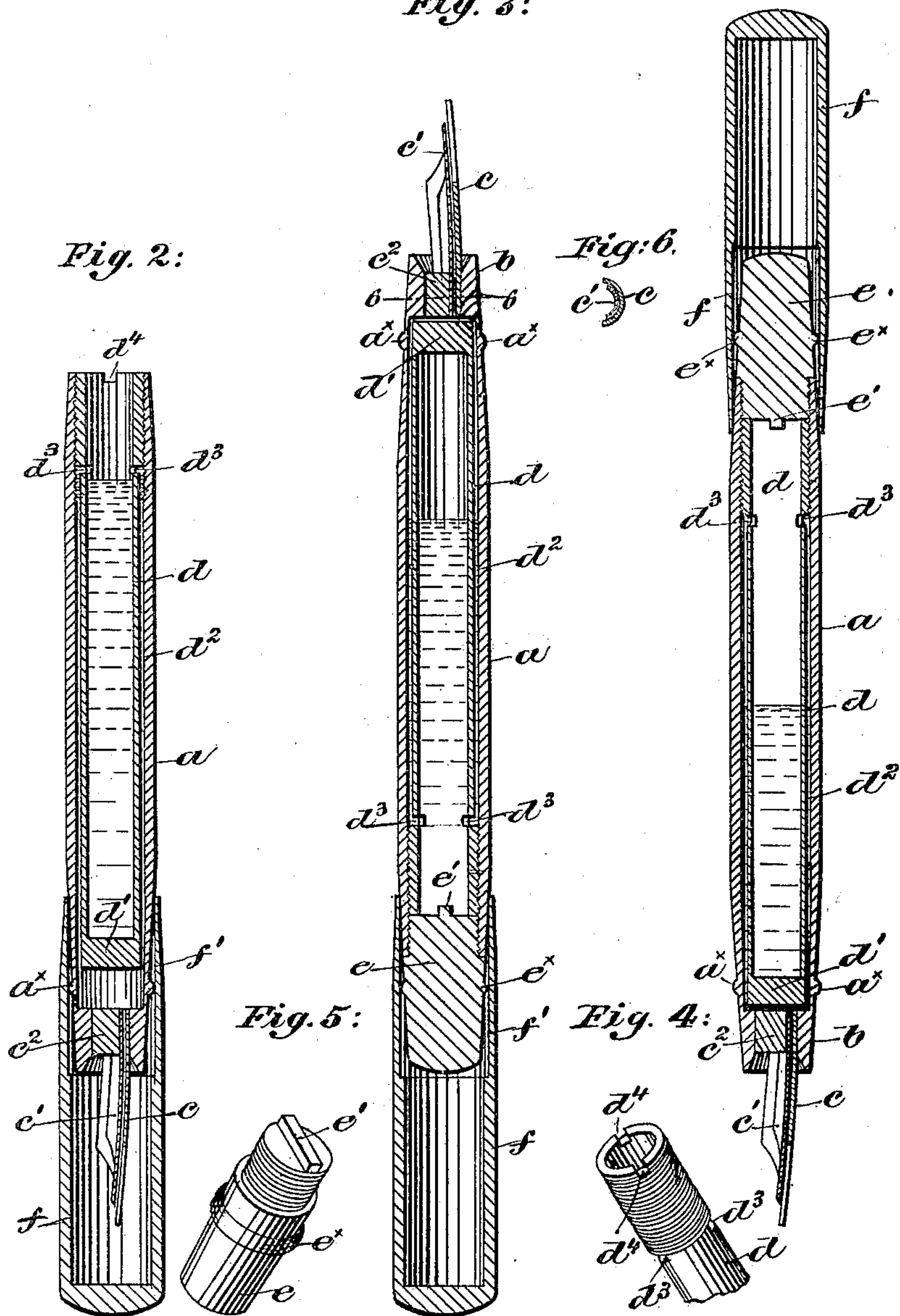
NO MODEL.

Fig. 1:

Fig. 3:

Fig. 2:

Fig. 6:



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UNITED STATES PATENT OFFICE.

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FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 722,013, dated March 3, 1903.

Application filed April 17, 1902. Serial No. 103,258. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. HAMILTON, a citizen of the United States, residing in the borough of Brooklyn, city of New York, county of Kings, State of New York, have invented an Improvement in Fountain-Pens, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In a fountain-pen as commonly constructed the exterior atmospheric pressure opposed to the vacuum within the ink-reservoir and above the body of ink therein is relied upon to prevent escape of the ink from the reservoir except as it is drawn downward to the pen-point by capillary action in the feed duct or groove. When, however, the body of ink in the reservoir becomes nearly exhausted, its power of resistance to the external air is frequently insufficient to prevent such air breaking through and destroying the contained vacuum, with the inevitable result that the ink, no longer restrained by vacuum, flows downward all at once and floods the pen, leaving a blot upon the writing-surface. To obviate this and to provide at all times a substantially uniform feed irrespective of the volume of ink in the reservoir, my present invention contemplates a pen wherein communication between the reservoir and the pen-section is had only through a capillary passage wherein the capillary action is such as to prevent the external air breaking through to destroy the contained vacuum and also such that varying quantities of ink within the reservoir exert little or no difference in feed of the ink to the pen.

It has hitherto been considered essential to provide an air-inlet opening at the writing end of the barrel to permit of the entrance of air necessary to act upon the ink in the barrel in opposition to the vacuum maintained therein above the ink. This opening is sometimes through the gold pen into the feed-duct beneath the same and is sometimes formed in the plug which is inserted in the end of the barrel for the purpose of holding the gold pen therein. In any event and however formed there is presented an opening of sufficient size to admit air enough to materially

tend to cause ink to flow downward and form a blot in the event of the air or pressure so admitted getting above any considerable portion of the ink. My invention comprehends the discarding of this air-admission opening or passage and sealing up the lower end of the pen absolutely, so as to prevent the ink running out accidentally and providing a capillary feed plate or device held close against the pen and providing between it and the pen a capillary feed down which the ink will draw by capillary action, but out through which it is impossible for the ink to flow under any air-pressure permitted to act upon it.

My invention further comprehends a novel means for retaining the cap in position upon the barrel.

The foregoing with other features of my invention will be hereinafter fully described, and set forth in the claims.

In the accompanying drawings, Figure 1 in vertical longitudinal section shows a pen illustrating one embodiment of my invention; Figs. 2 and 3, sectional views to illustrate the construction and operation of the pen to be described; Figs. 4 and 5, perspective details to be referred to; and Fig. 6, a sectional detail on the line 6-6, Fig. 3, showing the arrangement of the capillary feed-plate next to the pen and on a somewhat-exaggerated scale.

Referring to the drawings, first to Fig. 1, the barrel *a*, of usual shape, construction, and material, is shown as constructed at its lower end to form an integral pen-section *b*, which, however, may be detachable in usual manner, if desired, said pen-section being perforated axially to receive the pen proper or nib *c*, at one side of which (herein at the under side) is arranged the capillary feed-plate *c'*. This feed-plate is arranged close to the pen, the space separating the two being exaggerated in Fig. 3, it being well understood that ink will draw by capillary action through a space so contracted as to be practically invisible to the eye. Consequently this space separating the nib from the capillary feed-plate is wholly insufficient to permit ink to flow freely therethrough, yet will permit of the ink drawing therethrough to supply the

pen-point. Both the pen proper and this feed-plate are sealed into the bottom of the pen, herein by a plug or sealing material c^2 , thus making it a practical impossibility for ink to blot the paper. Within the barrel a is an internal ink-reservoir d , open at its top and closed at its bottom d' , its said upper end being threaded exteriorly to enable it to be screwed into the interiorly-threaded end of said barrel a . The exterior diameter of the reservoir d and the interior diameter of the barrel a are such as to leave a very contracted annular space d^2 between the two, which space I shall refer to as the "capillary reservoir," as distinguished from the interior space of the reservoir d , which I shall call the "supply-reservoir." Just below its threaded upper end the said supply-reservoir d is provided with one or more lateral perforations d^3 , through which communication is had between the said supply-reservoir and the said capillary reservoir. At its upper end (see Figs. 1 and 4) the supply-reservoir tube d is notched at diametrically opposite points, as indicated at d^4 , for engagement by the diametral rib e' of the crown-plug e . This crown-plug e is exteriorly threaded at its lower end to be screwed also into the upper end of the barrel a , the engagement of its diametral rib e' with the notches in the end of the reservoir-tube d serving to rotate the latter by and from said plug as the latter is screwed into and out from the said barrel. The usual cap f is provided, which when applied as in Fig. 2 closes the lower end of the barrel and when the pen is in use may be applied to the upper end of the barrel, as indicated in Fig. 1. This cap, as herein shown, is provided with a cylindrical internal bore f' , and to cooperate therewith the barrel at its lower end and the crown-plug e at the upper end are made tapering or conical and are also provided, respectively, with supporting-lips or alining ring-like lips a^x and e^x . The exterior diameters of the lips a^x and e^x are somewhat less than the maximum diameter of the tapered ends of the barrel, consequently are of the same internal diameter as the cylindrical bore f' of the cap. Thus when the cap is pushed into position upon either end of the barrel it closely fits over the lip e^x or a^x , which preserves its alinement, and may be pushed on until its open end becomes wedged upon the enlarged portion of the taper beyond. Thus there is provided the effectiveness of a wedging action between the cap and barrel; yet the alinement of the cap is maintained to preserve this wedging action not by any taper or wall projecting inward within the cap, but by the enlarged alining lip or ring back of the taper upon the holder itself.

To fill the pen initially, the cap is removed from the upper end of the pen, Fig. 1, the pen inverted, as in Fig. 2, and the plug e unscrewed, the unscrewing of this plug also unscrewing the reservoir-tube d , so that by the

time the plug has been completely disengaged from the barrel a the reservoir-tube d has been unscrewed to the position indicated in Fig. 2, with its end flush with the end of the barrel. The reservoir-tube d is now filled with ink, say, to the level indicated in Fig. 2—that is, to a level just below the lateral apertures d^3 . The plug e is now screwed into position, its engagement with the filled reservoir-tube d screwing the latter inward to its position Fig. 1. The ink in the reservoir-tube d or supply-reservoir cannot reach the pen except through the capillary reservoir d^2 , which is still empty and which can be filled only through the lateral apertures d^3 . Therefore the pen is now inverted, as in Fig. 3, and the ink from the supply-reservoir will flow through the lateral apertures d^3 into the capillary reservoir d^2 and will fill the latter to the level of the body of ink in the inner supply-reservoir. The pen is now reversed to its original writing position, Fig. 1, and the ink both in the supply-reservoir and in the capillary reservoir gravitates or draws to the bottom and the pen is ready for use. Referring now to Fig. 1, the only immediate ink-supply for the pen is that contained in the capillary reservoir d^2 , and this is so contracted and the capillary action such that with the reservoir unfilled or nearly empty the ink cannot descend more rapidly than the capillary action between the close annular walls will permit; neither can the external air penetrate or break through to destroy the vacuum within. Consequently whether the pen be filled or nearly empty substantial uniformity of feed is obtained and there is no liability of blotting the writing-surface by the breaking through of external air when the ink is nearly exhausted. When the supply of ink in the capillary reservoir is exhausted, it may be replenished by inverting the pen, as in Fig. 3, to cause it to be filled from the inner supply-reservoir through the lateral apertures d^3 . The capillary reservoir, however, will contain sufficient ink for several hours' continuous writing without reversal of the pen to replenish it.

My invention is not limited to the particular embodiment thereof here shown and described, but may be varied within the spirit and scope of the invention.

I claim—

1. A fountain-pen containing a capillary reservoir and a pen connected thereto.

2. A fountain-pen containing a capillary reservoir, a pen and a capillary feed-duct between the two.

3. A fountain-pen containing an ink-reservoir, a pen adjacent one end of said reservoir, and a normally open outlet for said reservoir at a point only, removed from said end.

4. A fountain-pen containing a capillary ink-reservoir, a pen connected therewith, and a second reservoir communicating with said capillary reservoir at a point removed from the end adjacent the pen.

5. A fountain-pen containing a supply-reservoir, and a capillary pen-supplying reservoir supplied therefrom.

6. A fountain-pen comprising a barrel carrying a writing-pen, and a contained perforated reservoir-tube separated from the inner wall of said barrel to leave an annular space in communication with said pen.

7. A fountain-pen provided with a supply-reservoir, a writing-pen, a second capillary reservoir to supply it with ink, and a communication between said two reservoirs, located above the normal ink-level in the pen when in use.

8. A fountain-pen comprising a barrel, a perforated reservoir-tube arranged within said barrel but separated therefrom forming thereby a second annular reservoir between said barrel and tube, a writing-pen connected with said second reservoir and means to close the ends of said barrel and tube.

9. A fountain-pen comprising a barrel carrying a writing-pen at one end, a perforated reservoir-tube screwed into the end of said barrel opposite said writing-pen, a plug also screwed into the same end of said barrel, and means for engaging said plug and reservoir-tube, to operate the latter by the former.

10. A fountain-pen provided with a pen-section carrying a writing-pen, an ink-reservoir, and a capillary space above said pen-section and constituting the only communi-

cation between said pen-section and said ink-reservoir.

11. A fountain-pen sealed at its lower end and provided thereat with a writing-pen and an adjacent feeding device separated from said pen to leave a capillary feeding-space only between them.

12. A fountain-pen provided at one end with a writing-pen, a capillary feeding device arranged close against it, to provide for capillary feed only between the two, and means otherwise to close the said pen end.

13. A fountain-pen comprising a barrel containing a capillary reservoir, said barrel being provided at its closed end with a writing-pen, and a feeding device arranged close against the same to permit of capillary feed only along the pen.

14. A fountain-pen having an exteriorly-tapering end provided with a raised portion beyond the largest diameter of the said taper in combination with a cap having a cylindrical internal bore to cooperate with said enlargement and taper.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT A. HAMILTON.

Witnesses:

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