

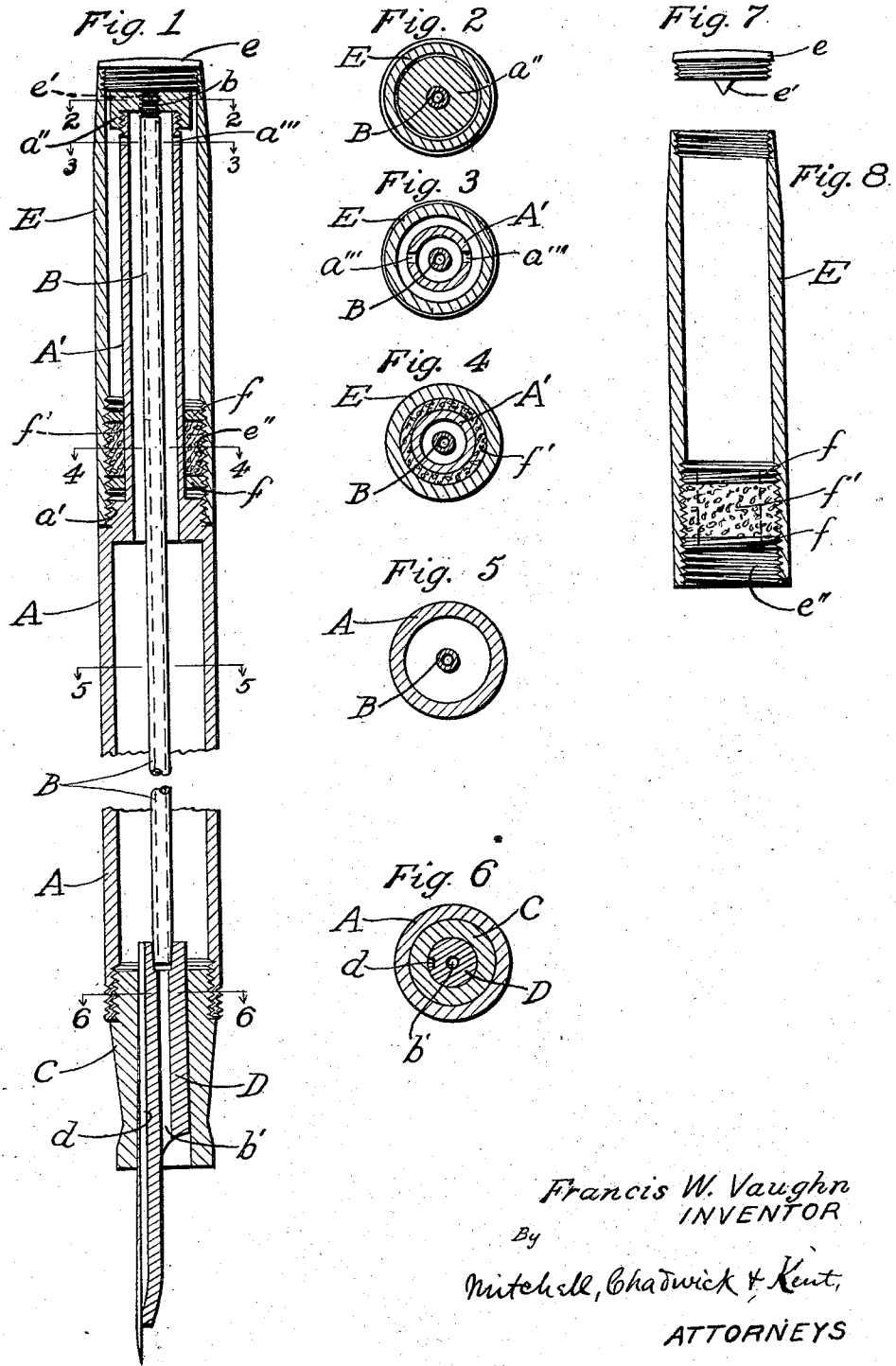
Sept. 9, 1924.

1,508,311

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FOUNTAIN PEN

Filed Aug. 7, 1922



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Patented Sept. 9, 1924.

1,508,311

# UNITED STATES PATENT OFFICE.

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## FOUNTAIN PEN.

Application filed August 7, 1922. Serial No. 580,324.

*To all whom it may concern:*

Be it known that I, FRANCIS W. VAUGHN, a citizen of the United States, residing at Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Fountain Pens, of which the following is a specification.

My invention is an improvement in fountain pens of the (so-called) "self-filling" type, in which the air within the fountain is rarefied, while the pen end of the fountain is submerged in ink, thus causing an influx of ink into the barrel until the air balance is restored, and the air in the fountain is then compressed and a portion discharged through an air pipe within the fountain. Such a device is shown in United States Patent to De La Rue, No. 926,611, dated June 29, 1909.

In the drawings:

Figure 1 is a longitudinal, sectional elevation of a fountain pen embodying my improvements;

Figures 2, 3, 4, 5 and 6 are cross sections on lines 2-2; 3-3; 4-4; 5-5; and 6-6 respectively, of Figure 1;

Figure 7 is a longitudinal sectional elevation of the cylinder of the sleeve member; and

Figure 8 is an elevation of the sleeve closure and cone.

In fountain pens of the self-filling type, in which moving parts must be fitted within the barrel of the pen to be actuated to cause the barrel to fill with ink, many pens which are theoretically perfect as a matter of illustration and of description, are perfectly impractical, owing to the fact that, in the actual manufacture of a real pen, the interior dimensions of the pen are too small to permit the fitting and placement of the designed parts or the accuracy of finish which is called for, within the limits of a commercial selling price.

My invention is designed to make a practical pen, which can be manufactured as a commercial proposition, all parts calling for accurate finish being outside surfaces, easily reached, the parts themselves being few in number and assembled and disassembled easily and quickly and those parts which may wear in use being easily adjusted to compensate for wear or easily and cheaply repaired or replaced if desired or necessary.

In the following description, when I refer to the "front" end of the pen it is to be understood that I mean the end in which is mounted the gold pen point and when I refer to the "rear" end of the pen it is to be understood that I refer to the opposite end of the pen.

In Figure 1 is shown a longitudinal sectional elevation of a pen embodying my improvement, in which A is the barrel or fountain, formed, preferably, at its rear end, with a reduced portion A'. At the junction point of the two diameters is a screw thread-surface *a'*. The outer surface of A' may be machine worked to give a true outer cylindrical cross-section of a glassy smoothness. The rear end of A' is closed by a cap *a''* screw threaded thereto, having an aperture *b*, preferably central, in which is secured one end of a pipe B. The front end of A is closed by a pen section C carrying the usual feed bar D, which has the usual ink fissures *d* and also has an aperture *b'*. The front end of pipe B is preferably slightly tapered and when the parts are assembled the tapered end of B enters aperture *b'* which then forms a continuation of pipe B, out of the fountain. The air passage constituted by pipe B and aperture *b'* it will be observed passes to the outside of the barrel at both ends.

Slidably mounted on the rear end of the fountain or barrel is a sleeve E closed at one end by a cap, *e*, having a cone *e'* and the sleeve E is also interiorly threaded at the other end, at *e''*, to coact with the threads at *a'*. This sleeve E carries within it a gland made up of two screw-threaded washers, *f*, enclosing a packing *f'* of cork or other suitable material. These washers engage the threads *e''* and may be screwed toward one another to compress the packing *f'*. At the outer end of A' and close to cap *a''* is an aperture *a'''* leading to the interior of A' and putting the interior of the barrel into communication with the interior of sleeve E.

The operation is as follows: The parts being assembled as in Figure 1, to fill, the front end of the pen section C is submerged in ink, and the sleeve E, being first unscrewed at *a', e''*, is drawn rearward. The effect of this unscrewing action is to release the sleeve E from its engagement with the barrel and also to remove the cone *e'* from the aperture *b* in cap *a''*. The rearward move-

ment of sleeve E, creates a partial vacuum in the sleeve and air passes from the barrel through aperture  $a''$  to the interior of the sleeve E, correspondingly attenuating the air in the barrel. No air of course can enter the barrel from the outside either at the front end or the rear end of the pen, and the attenuation of the air within the barrel, below atmospheric pressure, causes ink to be forced into the barrel by atmospheric pressure through ink fissure  $d$  in feed bar D. Upon reversal of the movement of sleeve E, air within the sleeve is expelled from the sleeve E to the outer air through pipe B, passing through the rear end of the barrel to and through the pipe and through the aperture  $b'$  to the air. This action is repeated, if desired, until all the air in the barrel has been drawn from the barrel into the sleeve and expelled through pipe B, the place of the air in the barrel being taken by ink forced into the barrel by atmospheric pressure.

It is true that upon the rearward stroke of sleeve E some ink will rise into the air pipe B, but upon forcing the sleeve E forward the air is compressed in sleeve E, barrel A and pipe B and the ink in the air pipe is expelled, followed by some air. At the same time some ink is expelled from the barrel through the ink fissure,  $d$ , but, as only ink can enter, the expelled air and any expelled ink is replaced at the next rearward stroke of sleeve E, by ink, so that the barrel is shortly evacuated of air which is replaced with ink.

When the filling operation is completed, the sleeve is again engaged with the barrel by screw threads  $a'$ ,  $e''$ , and as the sleeve is screwed onto the barrel, the cone  $e'$  seats in the cap aperture  $b$ , thus sealing the rear end of air pipe B.

In fountain pens having two separate and distinct passages for air expulsion and ink intake, no part of which passages are in common, as is the case in my improved pen, it is essential that means be provided for seal-

ing the air expulsion tube when the pen is not being filled, otherwise in the act of writing, the air would pass up the air tube to the upper end of the barrel above the contained ink in the barrel, and this ink would then flow by gravity through the ink fissure out of the barrel. By sealing the rear end of the air pipe, after the pen is filled, as the ink is used up in the writing operation, the air necessary to relieve the partial vacuum within the barrel thus created, must feed up, through the ink fissures, in bubbles, as is the standard practice in pens having no air pipe.

I claim:

1. In a fountain pen, a barrel, having at its rear end an air aperture and having also a second aperture at its rear end; a pen section seated in the front end of the barrel and having separate ink and air apertures there-through; a pipe within the barrel, connecting the pen section air aperture with a rear aperture to form an air passage through the barrel; a sleeve closed at its rear end and fitting air-tight and slidable upon, the rear end of the barrel, to withdraw air from the barrel through the second rear air aperture into the sleeve upon the rearward stroke and expel it through the pipe on the forward stroke.

2. As in claim 1, the rear end closure of the sleeve being adapted to seal the rear end of the air pipe air-tight when the sleeve is in its forward position.

3. As in claim 1, the sleeve having within its closed rear end a conical member to seal the rear end of the air pipe air-tight when the sleeve is in its forward position.

4. As in claim 2, the sleeve having at its open inner end, screw threads to engage screw threads on the barrel, and draw and hold the rear end of the sleeve to the rear end of the barrel.

Signed at Boothbay Harbor, Maine, this twenty sixth (26th) day of July, 1922.

FRANCIS W. VAUGHN.