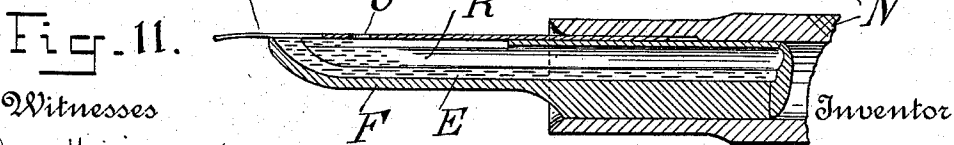
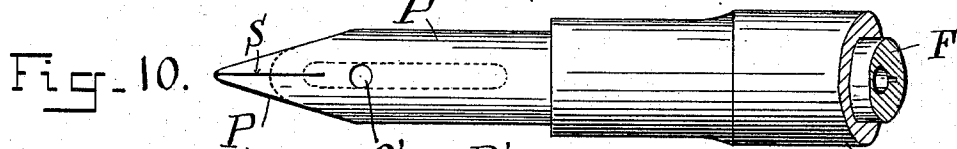
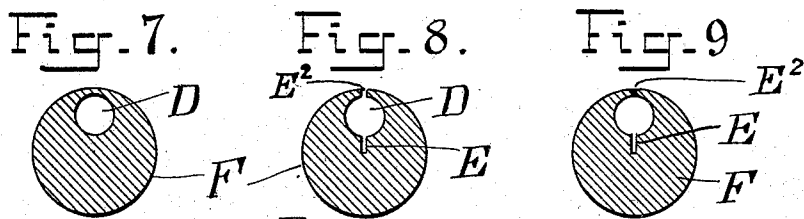
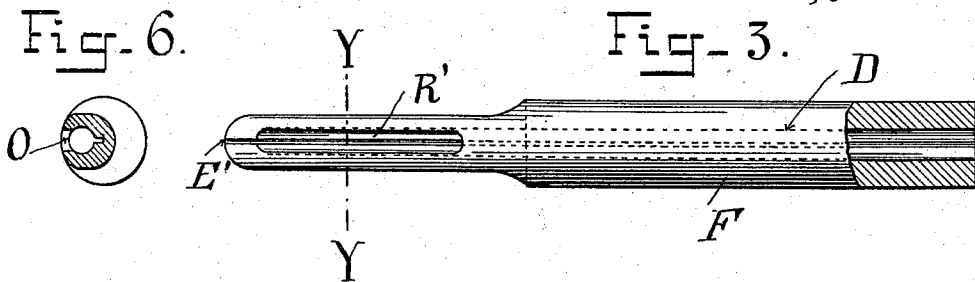
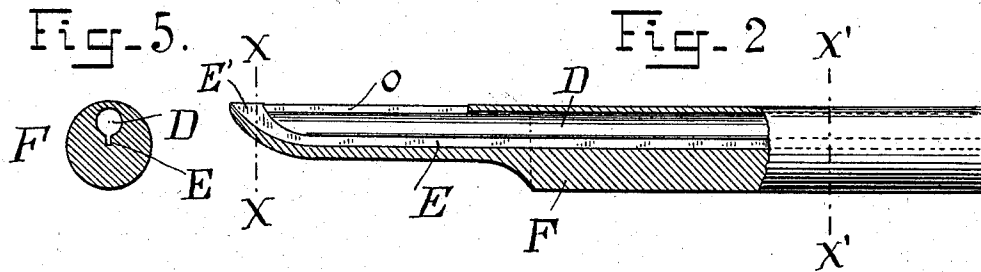
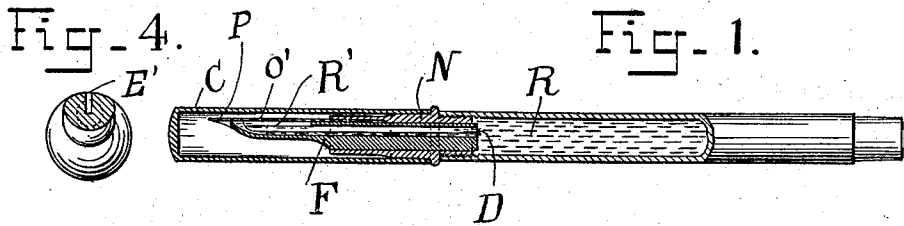


(No Model.)

L. E. WATERMAN.  
FOUNTAIN PEN.

No. 559,422.

Patented May 5, 1896.



Witnesses

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# UNITED STATES PATENT OFFICE.

LEWIS E. WATERMAN, OF BROOKLYN, NEW YORK.

## FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 559,422, dated May 5, 1896.

Application filed September 27, 1895. Serial No. 563,842. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS E. WATERMAN, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have made a new and useful invention in Fountain-Pens, of which the following is a specification.

My invention relates to improved means for feeding and regulating the feed of the ink in fountain-pens—that is to say, of conducting the ink from the reservoir to the pen and supplying the proper quantity of air to the reservoir in its place.

The object of my invention is to provide a feed-bar that will feed or conduct the ink from the reservoir to the pen through the nozzle in any desired quantity and without making contact with the inner channel or side of the nozzle, the feed-bar being provided with a closed channel or duct, preferably round and open only at the inner end and under the pen on the upper side and at the front. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a part sectional view showing all the parts of the pen in position. Fig. 2 is a part sectional and part side view of the feed-bar. Fig. 3 is a part sectional and top view of the same. Fig. 4 is a part sectional view cut on the line X X, Fig. 2. Fig. 5 is a sectional view cut on the line X' X', Fig. 2. Fig. 6 is a sectional view cut on the line Y Y, Fig. 3. Figs. 7, 8, and 9 are detail views showing different stages of the manufacture of the feed-bar. Fig. 10 is a top view of the front end of the fountain-pen with the pen in position, and Fig. 11 is a longitudinal sectional view of the same.

Similar letters refer to similar parts throughout the several views.

R is the reservoir, which may be of the form and construction shown, or of any other suitable form of construction.

N is the nozzle, which may be made as shown, or in any other suitable form to correspond with or conform to the reservoir.

F is the feed-bar, and C is the cap.

D is the duct or channel through the feed-bar. The first form of the duct D in the first stage of construction is shown in cross-section

in Fig. 7 as bored or otherwise made in the feed-bar F.

Fig. 8 shows a second stage of manufacture in which the capillary fissure E is formed in the longitudinal bottom of the duct D, preferably by sawing from without the whole length of the duct, as shown in Figs. 1, 2, and 3. The office of the capillary fissure E is to conduct the ink from the reservoir R to the secondary reservoir R' under the pen, and that of the duct D is to facilitate the operation by conducting air into the reservoir R to supply the place of the ink drawn therefrom by the fissure E. An opening or scarf O is cut in the top of the duct under the pen, as shown at O, Figs. 2 and 6, to give access and contact of the ink to and with the latter.

Fig. 9 shows the slit E<sup>2</sup> in the upper side of the duct, made by the saw in cutting the capillary fissure E, as closed. This upper fissure or slit E<sup>2</sup> may, however, be left open without avoiding my invention; but if it is left open it will receive ink, which will pass therethrough to the inside of the nozzle and, drying, will not only furnish obstruction, but assist in grinding out the inside of the nozzle, interfere with the air-flow by drying in the fissure E<sup>2</sup>, thereby making the ink-flow irregular, and be otherwise objectionable. The capillary fissure E may be made without sawing through the upper side of the duct channel or passage, as by channeling, but it may be made much easier by sawing, as described, the slit E<sup>2</sup> being afterward smoothly filled by cement or some suitable material. The duct or channel D, I prefer to make round in cross-section, not simply because it can be more easily bored out in that form, but because air-bubbles, which it is one of its functions to conduct up into the reservoir, thereby facilitating the ink-flow, will pass more readily through a round and unobstructed tube than through a square one—that is, with less friction and liability to detention. The ink is conducted to the pen entirely by capillary action, working in and through the capillary fissure E, which conducts the ink down to the extreme lower end of the feed-bar, where the fissure E', as cut in making the fissures E and E<sup>2</sup>, shows directly in contact with the under side of the pen P, rising in a curve at the

front end of the feed-bar opposite the split S in the pen, just where, in the act of writing, the movement of the pen opening and closing the split, the ink may be supplied directly and immediately to the pen and from the secondary reservoir R' in proper quantity, proportioned to the pressure put upon the pen. The fissure E in performing the function of so conducting the ink also provides or supplies the secondary reservoir R' with ink at, under, or in the bottom of the opening O and duct D, filling it from the bottom and up to the opening O' in the pen. This reservoir, so filling from the bottom, is fed by the capillary fissure E, which continuing to draw the ink from the reservoir R, as the air passes up through the duct D, fills the secondary reservoir R' until the ink reaches and stops the opening O' in the pen, when the flow of the ink will stop automatically. This automatic stoppage of the ink-flow is caused by the filling of the aperture or opening O', through which air is supplied to the duct on its way to the reservoir during the process of the transfer of the ink from the larger to the smaller reservoir; since the opening O' is the only opening through which air can get into the duct D.

When the pen is put in use by contact with the paper, the ink is presently drawn out and down from the secondary reservoir R' below the opening O', thus again opening the inlet to the air, and automatically facilitating the flow of ink to the pen as long as the ink in the secondary reservoir R' does not extend as high as the opening O'; but the moment the pen is taken from the paper the capillary fissures E and E', continuing to draw the ink from the reservoir or fountain R and to fill the secondary reservoir R' from the bottom upward, the flow of the ink will be again stopped by the filling of the air-inlet O', as before, and the ink will be thereby automatically retained in the secondary reservoir R'

and under the pen in position for immediate use at any moment. The higher up on the pen the opening O' is placed the larger will be the quantity of ink capable of being held in the secondary reservoir; but the opening O' must be so placed as to open a passage through the opening O into the duct D.

It is evident that by regulating the location and size of the opening O', the shape and size of the duct-channel D, the dimensions—that is, the width and depth—of the fissure E, the size of the secondary reservoir R', and even the stiffness of the pen P the flow of the ink may be controlled and gaged to any required extent and with the greatest delicacy.

It will be perceived that if the slit E<sup>2</sup> is left open to receive the ink from the reservoir and the ink dust or deposit from the inside surface of the nozzle N this will be likely to hang down here and there in irregular ways, whether wet or dry, into the duct-channel or air-supply duct D, or in the path of bubble movement, and thereby retard or arrest the air-bubbles on their way to the reservoir R, and so interfere with the supply of ink to the secondary reservoir R' and with the working of the pen.

I claim as my invention—

1. A feed-bar F provided with the duct or channel D, fissure E, and opening O.
2. A feed-bar F provided with the duct or channel D, fissure E and opening O in combination with the pen P provided with the opening O'.
3. A feed-bar F provided with the duct or channel D, fissures E and E' and opening O in combination with the pen P provided with the opening O'.

LEWIS E. WATERMAN.

Witnesses:

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EDWARD S. BERRALL.