C. W. LIVERMORE.

Stylographic Fountain-Pen.

No. 225,401. Patented Mar. 9, 1880.

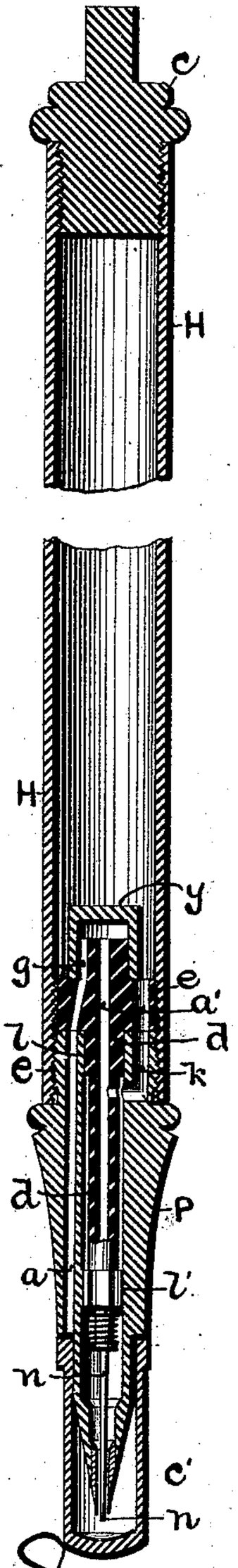

FIG. 1.

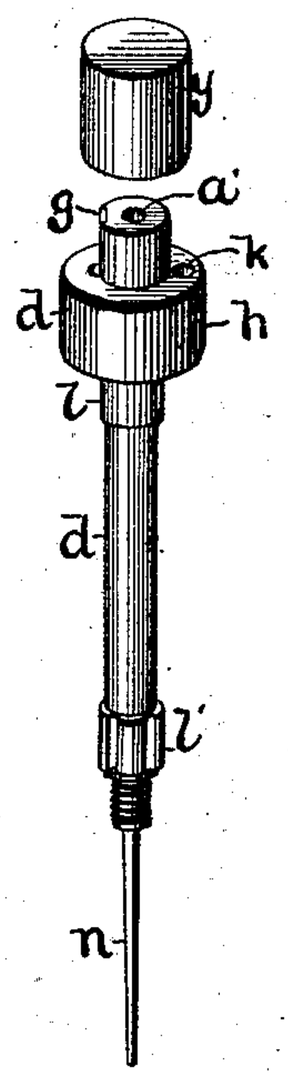

FIG. 2.

WITNESSES.

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CHARLES W. LIVERMORE, OF PROVIDENCE, RHODE ISLAND.

STYLOGRAPHIC FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 225,401, dated March 9, 1880.

Application filed October 4, 1879.

To all whom it may concern:

Be it known that I, CHARLES W. LIVERMORE, of the city and county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

My invention relates to that class of fountain-pens employing a needle-point or stylus in writing, and carrying a supply of ink in the upper tubular portion of the handle. The pen is divided into two parts, which I have denominated the "handle" and "pen" section, respectively. These parts are united at *e* by a screw or friction joint, or other convenient method.

In the accompanying drawings, which are made a part of this specification, Figure 1 represents a longitudinal central section of my improved fountain-pen. H is the handle, which consists merely of a tube of convenient size, closed air-tight at the top by a screw-cap, *c*, and open at the opposite end. The interior of this handle contains the reservoir of ink.

My invention resides in the organization of the pen-section P, which is attached to the lower and open end of the handle H, and in the combination of the same with the said handle.

The pen-section is tapered nearly to a point at its outer or lower end, and is provided with a longitudinal central passage its entire length. The lower portion of this passage, for a short distance, is very small, and only sufficient to allow the free play of the needle *n*, and the passage of the ink in quantities sufficient for writing. The remaining portion of the passage is much larger, and is occupied by the needle-carrier *d*.

Fig. 2 is a view of the needle-carrier and needle in perspective, much enlarged. This carrier is inserted in the pen-section, making a tight joint at the top by means of the collar *l* and head *h*. Below the collar *l* the spindle of the needle-carrier is turned down to a smaller diameter, to allow space for the ink, and at its lower end, to which the needle is attached, is a guiding-collar, *l'*, fitting the passage, and provided with grooves or ink-passages. This guiding-collar keeps the needle-carrier in a central position, and thus prevents binding or cramping the needle. The ink passes from the reservoir in the handle H into the passage occupied, in part, by the needle-carrier in the pen-section P; but as the entrance to this passage is closed by the head *h* of the needle-carrier, I provide an ink-duct, *k*, through the head *h* and into the interior of the pen-section.

The admission of air to the reservoir, as the ink is gradually exhausted, has an important influence upon the action of the pen. If air is admitted too freely the outflow is liable to be too great, and also to take place when the pen is not in use, thereby causing inconvenience.

I have arranged to admit the air to the ink within the pen-section in the narrow annular space around the spindle of the pen-carrier, whence it rises through the ink-duct *k*, and thence through the body of ink in the reservoir to the top.

For conducting the air to the interior of the pen-section I open an air-passage, *a*, into the wall of the pen-section, and extend it upward within said wall to the top and through the head *h* of the needle-carrier. This passage is continued by a groove, *g*, in the side of an upward extension of the needle-carrier, (shown clearly in Fig. 2,) said groove being inclosed by the cap *y*. This outside upward passage is connected with a downward air-passage, *a'*, extending through the needle-carrier, and opening through the side thereof into the annular space in the pen-section around the spindle of the needle-carrier. These two passages *a* and *a'* are connected under the cap *y*. As the ink is drawn out of the reservoir, tending to create a vacuum at the top, the air is forced in through the passages *a* and *a'*, and delivered in the annular space in the pen-section. It then works its way upward through the duct *k*, and thence to the top of the ink.

The ink in the duct *k* and in the annular space below the duct, being affected by the capillary attraction in these narrow passages, offers a considerable resistance to the ingress of air, the effect of which is to hold in check the too rapid flow of ink at the writing-point.

The air-passages *a a'* require to be small, in order to hold the ink by capillary attraction from penetrating therein in sufficient quanti-

ties to escape from the external orifice of the same.

The upward air-passage in the head *h* of the needle-carrier must, of course, form a continuation of the passage *a* in the wall of the pen-section, and in putting the parts together this must be observed. Likewise, in the present model and drawings the duct *k*, after passing through the head *h*, penetrates into the wall of the pen-section to a point below the collar *l*, and then opens into the ink-space, and these passages must, therefore, coincide. These parts are easily made to fit with great nicety, and no difficulty arises in uniting them, so as to make the passage continuous from one to the other.

In the present model the bottom of the ink-duct *k* is let into the interior space by boring radially through the wall of the pen-section from the outside; but the external orifice of this bore is covered by the wall of the handle when screwed home, and is thus made tight.

The writing-point of the pen is covered, when not in use, by the cap *c'* as a protection, and in case the air-passage *a* has its external orifice located as shown in the drawings and model this cap can also be made to cover and close said orifice against the ingress of air or any substance liable to choke it, and also against the possible escape of ink in consequence of accident in carrying the pen.

I do not herein claim the combination, with the handle or pen-case, of a needle-holding tube attached to and supported by the walls of said handle; nor do I herein claim the combination, with a sectional handle, of a needle-holding tube inserted and secured in the lower section, these several subjects-matter being embraced in my pending application for Letters Patent filed on or about August 15, 1879, and now in interference.

What I claim, and desire to secure by Letters Patent, is—

1. In a fountain-pen, the pen-section P, provided with the needle-carrier *d* and ink-duct *k*, for conducting the ink into the same from the reservoir, and also provided with an air duct or passage, *a a'*, located within said pen-section, all substantially as described, and for the purposes specified.

2. In combination with the handle H, the pen-section P, provided with the needle-carrier *d* and the air-tube *a a'*, substantially as shown and described.

3. In combination with the point-section provided with an air duct or tube, as described, the cap *c'*, constructed to close the entrance to the air-tube when the pen is not in use.

4. In a fountain-pen, the handle H, closed against the admission of air through the walls of the same to any part of the pen, in combination with a point-section provided with an air-duct, said point-section being in communication with the interior of said handle, (and supplying air thereto,) substantially as herein-before set forth.

CHARLES W. LIVERMORE.

Witnesses:
LUCIUS O. ROCKWOOD,
HENRY W. HAYES.