

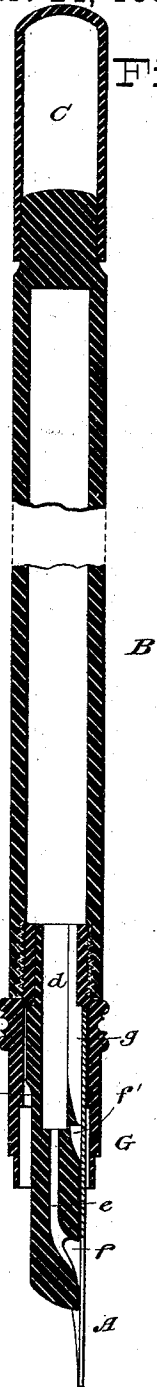
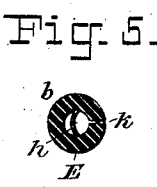
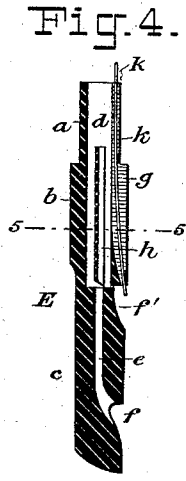
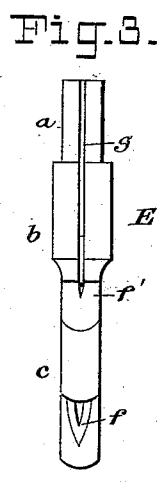
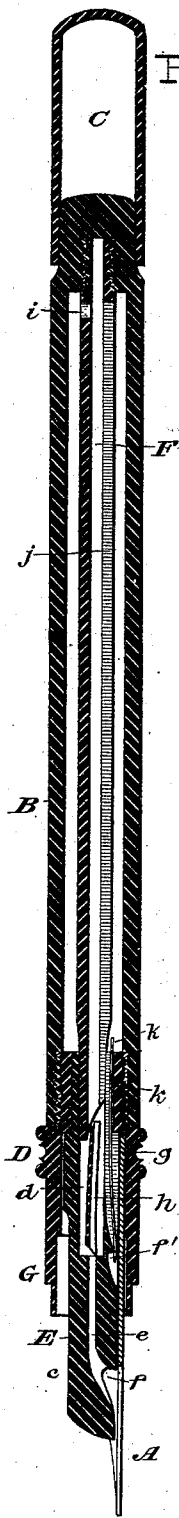
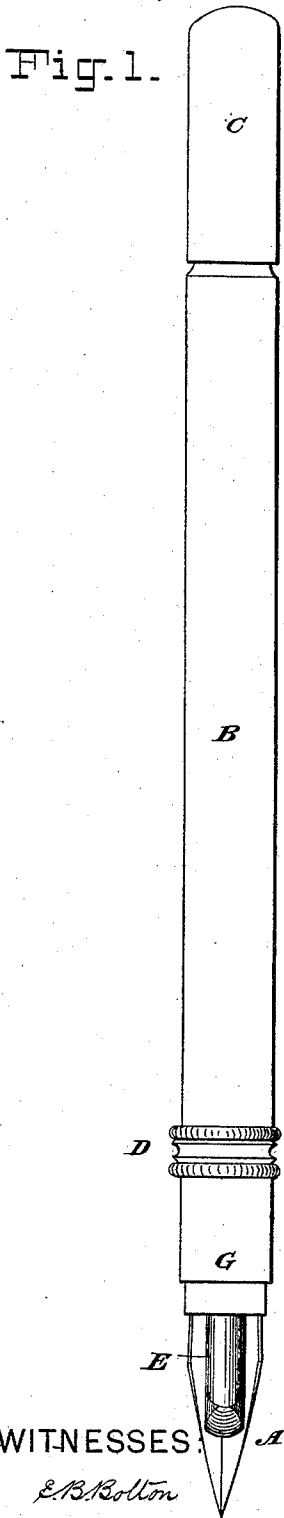
(No Model.)

W. W. STEWART.

FOUNTAIN PEN.

No. 314,547.

Patented Mar. 24, 1885.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM W. STEWART, OF BROOKLYN, NEW YORK.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 314,547, dated March 24, 1885.

Application filed June 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. STEWART, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Fountain Pen-Holders, of which the following is a specification.

My invention relates to that class of pen-holders wherein the tubular handle or reservoir for holding the ink is closed or sealed at its upper end, and the ink is conducted to the pen through a duct, its place being taken by air entering the holder near its lower end.

My Patent No. 214,795, dated April 24, 1879, describes a holder having two or more vents arranged to alternately discharge ink and admit air, the object being to prevent the interference between the entering bubbles of air and the downflowing ink.

My present invention constitutes an improvement upon the pen described in that patent, as will be hereinafter fully described.

Figure 1 of the accompanying drawings is an exterior view of the pen and holder. Fig. 2 is a longitudinal mid-section thereof. Fig. 3 is a front view of the feed-pipe removed. Fig. 4 is a longitudinal mid-section of the feed-pipe. Fig. 5 is a transverse section thereof on the line 5 5 in Fig. 4, and Fig. 6 is a view similar to Fig. 2, but showing a modification.

Let A designate the pen; B, the reservoir-holder, closed at its upper end; C, the removable cap for inclosing the pen when not in use; D, the plug closing the lower end of the holder A; E, the feed-pipe, and F the film-tube.

The plug D screws tightly into the lower end of the holder B, and is formed or provided with the tubular extension G, described in my Patent No. 237,454, dated February 8, 1881. Inside of this plug D the feed-pipe E fits snugly, the pen being embraced between the outer surface of the feed-pipe and the inner surface of the tubular plug, as usual.

Referring to Figs. 3 and 4, the feed-pipe E is formed with a reduced cylindrical shank, *a*, a larger cylindrical body portion, *b*, and a reduced lower portion, *c*. The latter is reduced on its back and sides, and comes close against and conforms to the under side of the pen on its front face. The feed-pipe is bored with a large hole, *d*, and a small hole, *e*, the former forming what I call the "condensing-chamber," and the latter being an ink-duct leading down to near the lower end of the pipe.

Across the front face of the portion *c* of the pipe are formed two angular notches, *f* and *f'*, which I call "grips." These are of saw-tooth form, their abrupt sides being uppermost and their inclined sides being turned downward toward the point of the pen, as shown. This form is best adapted to hold the ink by capillarity, checking its tendency to run down the pen in drops or "tears," and it also facilitates the breaking up and saturation or condensing of the entering bubbles of air. The hole *e* leads down to the lower grip, *f*, and the upper grip, *f'*, communicates through a small hole or vent opening into the chamber *d*. These two grips serve to hold by capillary attraction a small mass of ink in contact with the pen, where it is ready to be instantly applied to the pen-point whenever the writer wishes to make a heavy stroke or shade. In this respect they differ from the construction shown in my said Patent No. 214,795, which most nearly resembles my present construction. In that patent there are one or two vents communicating with the condensing-chamber, and a slender ink-tube leading thence down to near the point of the pen, but not touching the pen except at its open lower end. Neither the vent above nor the open end of this pipe below possesses the function of my present grips, in that they are not adapted to hold a mass of ink in reserve against a sudden demand for it, as is the purpose of these grips. The result is that my present pen can be used for writing with heavy shades without being constructed with a compressible holder, such as is shown in my said patent.

Above the upper grip, *f'*, a slit, *g*, is formed through the front side of the feed-pipe, extending to the upper end thereof. This slit is sufficiently narrow to exert a capillary attraction upon the fluid, being what I term an "attractive," and it consequently holds continually a line of fluid which it may conduct down to the pen, thus avoiding any interference between this fluid and the rising bubbles of air. The ink will flow down through this slit *g*, and through the chamber *d* and duct *e*, and will pass to the pen by either grip *f* or grip *f'*, or by both grips simultaneously. At the same time the air which flows in to replace the ink used will enter at one or other of the grips—usually at the upper one—and will pass in the form of minute bubbles into the condensing-chamber *d*, where the bubbles

become saturated, and are conveyed upward into the ink-reservoir. The condensing-chamber should be divided by means of one or more cross-partitions, one only (lettered *h*) being shown. Fig. 5 best illustrates this partition. Its action is to break up the bubbles and cause them to pass on its opposite sides, and to prevent the formation of large bubbles in the chamber, which would cause the flow of ink to be irregular.

In order to keep the capillary slit *g* always open and free from clogging or the formation of a solid deposit from the ink, I insert in it what I term an "irritant," which consists of a piece of bristle, a horsehair, a fine polished gold wire, or other slender flexible substance, *k*, preferably not an absorbent. This should be free to move in the slit, and may derive motion from the pen by its lower end bearing against it, or not, as desired. Its action is to attract to itself the water of the ink, thus keeping the slit, as it were, always lubricated with a solvent of the solid constituents of the ink.

Through the holder B extends a small tube, F, which I term the "film-tube." This is similar in principle to the inner chambers or reservoirs in some of my previous patents, notably Patent No. 237,454, dated February 8, 1881. Its function is to prevent the sudden drying of the interior of the reservoir when the latter is nearly empty. The bubbles of air or froth or film of saturated air and ink will occupy the interior of this tube and ascend through it to its upper end, where is formed a hole, *i*, Fig. 2, through which the air will escape into the holder. This film-tube is made with a capillary slit, *j*, extending down one side to its lower end, which slit forms a capillary conduit or duct for the ink to climb into as it is forced from the interior of the tube by the rising air. The tube F extends down to and preferably fits into the upper end of the feed-pipe E, thus forming a continuous air-passage from the pen below to the top of the holder, and also with the slit in the feed-pipe, forming a continuous capillary line from the top of the holder down to the ink-grips at the pen.

When the holder is first made and its interior surfaces are dry its operation will be found very defective, as is the case with all pens of this character, because the ink is governed by the attraction of gravitation rather than by capillary attraction, the result being that the ink rolls or flows out of the pen too freely. It is only after the interior surfaces have been well soaked that the capillary action is as above described, at which time the flow of ink adapts itself automatically to the demand for it.

The construction of pen thus far described is that which is preferred and which operates most perfectly. It is, however, desirable to make a cheaper pen, and for this purpose certain features of my present invention may be discarded. Fig. 6 shows a pen of this

character, the irritant *k*, the film-tube F, and the partition *h* being dispensed with. The operation of the remaining parts is the same as above described.

The feed-pipe F, being removable, may be adapted and fitted to many existing pen-holders. In this way holders which have been constructed according to incorrect principles may be made operative.

I claim as my invention—

1. A fountain pen-holder consisting of the combination, with the ink-reservoir, closed at its upper end, of a feed-pipe extending down close along the under side of the pen, formed with a capillary grip or cavity on its side against the pen, having the shape of a saw-tooth, with its abrupt side above and its inclined side below or toward the point of the pen, and the ink-duct leading from the reservoir to said cavity, substantially as set forth.

2. A fountain pen-holder consisting of the combination, with the ink-reservoir, closed at its upper end, of a feed-pipe with an ink-duct through it for conveying ink therefrom to the pen, provided with one or more cavities or grips for holding the ink against the pen, and with a capillary slit extending to the duct and from the ink-reservoir down to said grip, substantially as set forth.

3. The feed-pipe E, for a fountain pen-holder, formed with an ink-duct through it, one or more recesses or grips on its external surface designed to come in contact with the pen, and with a capillary slit extending down from its upper end, substantially as set forth.

4. The feed-pipe E, for a fountain pen-holder, formed with an ink-duct through it enlarged to form a chamber, *d*, and a partition, *h*, fixed in said chamber and dividing the same into two separate passages, substantially as and for the purposes set forth.

5. The feed-pipe E, for a fountain pen, formed with an ink-duct through it, and with a capillary slit, *g*, through its wall, and provided with an irritant, *k*, of a smooth flexible substance arranged in said slit, for the purposes specified.

6. In a fountain pen-holder, the combination, with the closed ink-reservoir, of the feed-pipe having an ink-duct leading thence down to the pen, and a film-tube, F, arranged in the reservoir, and provided with a capillary slit, *j*, along its side, substantially as and for the purposes set forth.

7. The combination of reservoir B, slitted film-tube F, extending therethrough, and the removable feed-pipe E, its upper end embracing the lower end of said film-tube, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM W. STEWART.

Witnesses:

ARTHUR C. FRASER,
HENRY CONNETT.