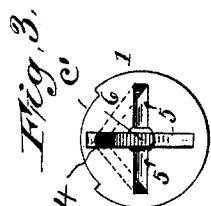
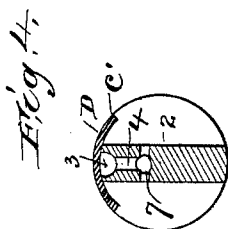
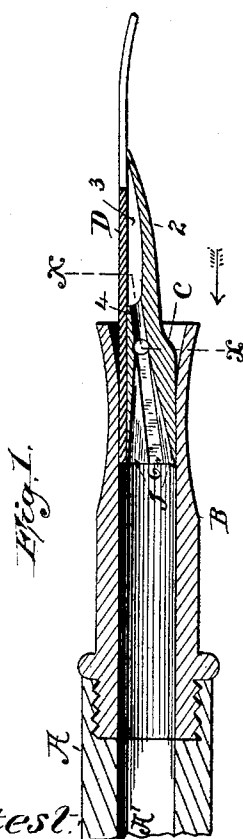
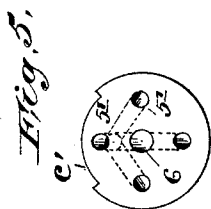
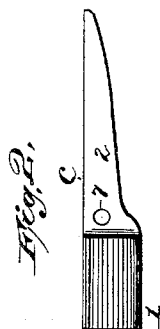


(No Model.)

B. V. EATON.
FOUNTAIN PEN.

No. 586,547.

Patented July 20, 1897.



Attest:
C. W. Benjamin
Audrey Ison

Inventor:
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by *Carroll Ladd-Davis*
att'y

UNITED STATES PATENT OFFICE.

BENJAMIN VANDEMARK EATON, OF BROOKLYN, NEW YORK.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 586,547, dated July 20, 1897.

Application filed March 26, 1894. Serial No. 505,069. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN VANDEMARK EATON, 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-Pens, of which the following is a specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of fountain-pens in which the nib of a writing-pen of ordinary form is supplied with fluid ink from a suitable reservoir, which reservoir consists, preferably, of a hollow formed for that purpose in the handle or holder of the pen; and the object of my said invention is to secure a certain and free flow of ink to the pen under varying conditions of use, as a greater or less quantity is needed, according as fine or heavy lines are made with the pen.

I have discovered by actual experiment that when the ink is fed to the feed slot or groove of a fountain-pen feed-plug or ink-duct through a comparatively short ink-channel, to which the ink is fed from the reservoir through one or more channels of preferably larger area than the ink-channel, but preferably of such shape as to exercise greater relative capillary attraction upon the ink than does the ink-channel, and also that when the feed-plug is provided with an air-vent which allows air to enter the channels through which the ink flows from the reservoir to the pen between such reservoir and the pen, while the ink flows regularly and uniformly and will not drop from the pen except under the most excessive agitation, the same answers much more readily to the exigencies of heavy shading than in the pens now in use.

This fountain-pen of my invention is composed in substance of a feed-plug having an ink-channel communicating at one end with a feed slot or groove which is adjacent to the pen and at the other with one or more capillary feeding-channels and an air-vent located in the ink-passage thus formed at some point between the ink-reservoir and the feed-slot, although it is not to be understood that the invention is limited to a device neces-

sarily comprising at once all of the elements aforementioned, for the invention consists in the construction of certain of said elements and certain various combinations or arrangements of said elements, all substantially as will be hereinafter fully described, and set forth in the claims.

While not limiting myself strictly thereto, I prefer to form my improved fountain-pen of the particular construction, combination, and arrangement of the several parts thereof shown and described in the following specification, of which the accompanying drawings form a part, wherein similar letters and numerals of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a side view, in central longitudinal section thereof, of the lower portion of the reservoir-holder of a fountain-pen with my new and improved form of feed-plug or ink-duct in position therein. Fig. 2 is a side view of the feed-plug or ink-duct removed from the holder. Fig. 3 is a rear view of such feed-plug or ink-duct. Fig. 4 is a front view of the construction shown in Fig. 1, looking from the pen-point rearward to the reservoir, in section on the line X X of said Fig. 1, the reservoir and pen-barrel not being shown.

Referring to the drawings, the reference-letter A designates the hollow barrel or tube for containing the ink, it being provided for that purpose with the interior hollow or reservoir A', while B is the hollow endless end piece for holding the feed-plug or ink-duct therein, which end piece B preferably forms a continuation of the reservoir A and is secured thereto by an air-tight screw-joint, as shown, the reservoir A' being, of course, preferably permanently closed at the upper end in the usual manner and such reservoir handle or holder A and end piece B therefor being both preferably formed of hardened india-rubber or any other suitable light material.

Held in place in the outer bell-shaped end of the end piece B by the feed-plug or ink-duct C is the pen D, which may be of any desired form and material, such plug C, for the purpose of better holding the pen in position, being preferably provided with a suitable slot

c', formed for that purpose in the upper rear portion thereof, as shown.

The feed-plug or ink-duct C is preferably formed of the same material as is the holder A and end piece B, and the same is preferably of substantially the shape shown, consisting of a cylindrical rear portion 1, from the front side of which projects a narrow elongated tongue 2, in the top side of which is preferably formed the feed slot or groove 3, which is preferably of substantially the shape, position, and relative size shown. Communicating with this feed slot or groove 3, preferably at the extreme rear end of such groove, as shown, is the ink-channel 4, which is in communication with the reservoir A' in the barrel A by way of one or more capillary feeding-channels 5, which channels 5 are preferably of such shape that while the total area of such channels in cross-section thereof is greater than the area in cross-section of the ink-channel 4 the capillarity of such channels 5 will be much greater in proportion to their cross-area than is that of the ink-channel 4 in proportion to its cross-area, and by reason of this construction, while the ink is fed freely and uniformly to the pen in any quantity desired, the flow thereof is so retarded by friction against the walls of the capillary channels 5 as to prevent dropping of the ink from the pen except when subjected to the most violent agitation.

The capillary channel or channels 5 are preferably of the form shown in Fig. 3, consisting of a narrow slit or slits, and the preferred method of forming such slits is to bore a small circular hole 6 through the rear cylindrical portion 1 of the feed-plug from, at, or near the center of the rear face thereof to the rear of the feed slot or groove and to then pass a fine scroll-saw through such perforations and saw away from such hole or perforation 6 in four directions by bearing down upon the rear of the saw and taking care not to saw much, if any, into the perforation 6 at the front end thereof, whereby the channels or slits 5 will be formed in the cylindrical rear portion of the feed-plug, presenting the form of a Greek cross at the rear face of the plug, as shown in Fig. 3, and being each of a somewhat triangular form in longitudinal section thereof, as shown in Fig. 1.

I do not intend to limit myself to any particular number or form of capillary channels 5, but, as before stated, prefer to have the same of such shape as to exercise the greatest possible amount of capillary attraction upon the ink in the same, and communicating with the ink-feeding channel or passage formed by the ink-channel 4 and such capillary channels 5, preferably at the junction of the two, as shown, is an air-vent 7, by which air is brought into contact with the stream of ink before the same reaches the feed slot or groove 3, which air-vent consists, preferably, of a suitable hole or perforation bored or

otherwise formed through the feed-plug or ink-duct from side to side thereof, so as to intersect the channels through which the ink flows from the reservoir to the ink slot or groove, preferably through the tongue 2, immediately forward of the cylindrical rear portion 1 thereof, so as to intersect the ink-channel 4 and capillary channels 5, whereby the air is admitted to such channels from two sides.

The length and relative size of the ink-channel 4 and the distance from the air-vent 7 to the feed slot or groove 3 vary according to the use for which the pen is designed. For fine hair-line writing the air-vent 7 is formed nearer to the feed slot or groove 3 than for heavy-shaded writing, and the particular point at which to place the air-vent 7 for each particular use can best be determined by experiment.

The operation of my improved pen is as follows: The reservoir A' within the handle or holder A having been filled with suitable ink in the well-known manner, and the end piece B, within which is placed the pen D and feed-plug or ink-duct C, having been screwed thereon, the parts will be in the position shown in Fig. 1, and the device will be ready for use. As soon as the pen is held with the point downward the ink will flow to the same by way of the capillary feeding-channels 5, ink-channel 4, and feed slot or groove 3 and as soon as the pen is pressed upon the paper or other writing material and is moved over the same will begin to flow from the pen in the well-known manner, and as fast as the ink flows from the pen more ink to take the place of that which has passed off is drawn by the sucking action of the ink in the feed slot or groove and ink-channel 4 from the reservoir A' through the capillary feeding-channels 5, and this descending column of ink to supply the pen is practically an unbroken one, for the reason that while the ink is descending in one of the capillary feeding channels or slots 5 the air to take the place thereof is passing into the reservoir through either another slot or another portion of the same slot, and the air entering such channel or channels through the air-vent 7 exercises a slight retarding influence upon the descending column of ink, so as to prevent too-rapid flowing of same to the pen. The said air-vent 7 is of such small size that the ink rarely, if ever, flows out through the same, being kept in a solid column extending through the channel 4 by the natural tendency of all liquids to cling together.

As before stated, by reason of the high capillarity of the channels 5 and the passage of the air back into the reservoir by way of the same the flow of the ink through such channels 5 is somewhat retarded and is consequently slow. The instant, however, the ink has passed below the air-vent 7 this retardation ceases, and as the air is behind as

well as in front of the same the force of gravity acts strongly thereon and the same will flow to the pen quickly in answer to demands for heavy shading until all the ink in the ink-channel 4 and feed-slot 3 has been used, and in practice it has been found that the ink will flow sufficiently free to answer all demands, for, no heavy shading of ordinary writing being continuous, even should the column of ink in the channel 4 be completely broken this will only be for a second or so, as the ink will then be delivered faster for a moment from the channels 5 to make up the sudden deficiency, and before all the ink has been used that is in the feed-slot and channel 4 the broken column of ink will be made whole, whereby it will be seen that although the column of ink flowing to the pen may at times be broken the flow of ink from the pen to the paper is continuous.

The ink-channels 5 may be of any desired form and size; but I prefer to have them consist of a number of slots, as shown, which communicate with one another at the center, as by this arrangement the column of ink descending to the pen is a single one, and I have found the best results to be obtained from this form of channel. However, in some cases instead of the slots 5 a series of channels 5', in the form of circular holes or perforations, as shown in Fig. 5, may be used, such holes or perforations being so formed as to all communicate with the channel 4, or in some cases even with the feed slot or groove 3.

It is evident that many changes in the construction, combination, and arrangement of the several parts of my improved fountain-pen other than those mentioned may be made without departing from the scope of my invention, and I do not by any means intend to limit myself strictly to the exact form shown; but,

Having now particularly described and ascertained the nature of my said invention, its construction and operation, what I claim and desire to secure by Letters Patent, is—

1. In a fountain-pen, a feed-plug having a plurality of capillary feeding-channels inclosed within the plug and consisting of narrow slits in communication with one another at or near the center of the plug and in communication with the ink-reservoir and with the pen, substantially as shown and described.

2. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, a passage leading from the ink-reservoir to the feed-slot and forming the sole communication between them, and an air-vent consisting of a perforation or hole 7 passing horizontally through the feed-plug and intersecting the passage at or near the center of such perforation and in free communication with the air at both ends, substantially as shown and described.

3. In a fountain-pen, a feed-plug having an ink-channel in communication with the pen,

and a plurality of capillary feeding-channels inclosed within the plug and consisting of narrow slits in communication with one another at or near the center of the plug and in communication with the ink-reservoir and with the ink-channel, substantially as shown and described.

4. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, and one or more capillary feeding-channels in communication with the ink-channel and with the ink-reservoir inclosed within the plug which has an imperforate peripheral wall, substantially as shown and described.

5. In a fountain-pen, a feed-plug having inclosed within the plug one or more capillary feeding-channels in the form of slits of less width than height through which the ink is fed to the pen, substantially as shown and described.

6. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, one or more inclosed capillary feeding-channels in communication with the ink-channel and with the reservoir, and an air-vent in communication with the passage formed by the ink-channel and the capillary feeding-channels, substantially as shown and described.

7. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, one or more inclosed capillary feeding-channels in communication with the ink-channel and with the reservoir, and an air-vent in communication with the ink-channel and the capillary feeding channel or channels at the junction thereof, substantially as shown and described.

8. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, and one or more inclosed capillary feeding-channels 5 in the form of slits of less width than height in communication with the ink-reservoir and with the feed-slot, substantially as shown and described.

9. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, and one or more inclosed capillary feeding-channels of the form of slits of less width than height in communication with the ink-channel and with the ink-reservoir, substantially as shown and described.

10. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, one or more inclosed capillary feeding-channels in the form of slits of less width than height in communication with the ink-channel and with the ink-reservoir, and an air-vent in communication with the passage formed by the ink-channel and the capillary feeding-channels between the reser-

voir and the feed-slot, substantially as shown and described.

11. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, one or more capillary feeding-channels in the form of slits of less width than height in communication with the ink-channel and with the ink-reservoir, and an air-vent consisting of a perforation or hole passing through the feed-plug and communicating with the air at both ends and with the passage formed by the ink-channel and the capillary feeding channel or channels at or near the center of such perforation, substantially as shown and described.

12. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, and a plurality of capillary feeding-channels consisting of narrow slits in communication with one another along the entire length thereof at or near the center of the plug and in communication with the ink-reservoir and with the feed-slot, substantially as shown and described.

13. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, and a plurality of capillary feeding-channels consisting of narrow slits in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel, substantially as shown and described.

14. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, a plurality of capillary feeding-channels consisting of narrow slits in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel, and an air-vent in communication with the passage formed by the ink-channel and the slots between the ink-channel and the ink-reservoir, substantially as shown and described.

15. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, a plurality of capillary feeding-channels consisting of narrow slits in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel and which are inclosed by the imperforate peripheral wall of the plug, substantially as shown and described.

16. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, a plurality of capillary feeding-channels consisting of narrow slits

in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel, and an air-vent in communication with the ink-channel and with the capillary feeding-channels at the junction thereof, substantially as shown and described.

17. In a fountain-pen, a feed-plug or ink-duct having a feed slot or groove adjacent to the pen, an ink-channel in communication with the feed-slot, a plurality of capillary feeding-channels consisting of narrow slits in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel, and an air-vent consisting of a perforation or hole passing through the plug and intersecting the passage formed by the slits and ink-channel 4 through which the ink flows from the reservoir to the pen, such perforation being in communication with the air at both ends, substantially as shown and described.

18. In a fountain-pen, a feed-plug having an ink-channel 4 in communication with the pen, one or more capillary feeding-channels inclosed within the plug in communication with the ink-channel 4 and with the ink-reservoir, and an air-vent in communication with the passage formed by the ink-channel and the capillary feeding-channels, substantially as shown and described.

19. In a fountain-pen a feed-plug having an ink-channel 4 in communication with the pen, one or more capillary feeding-channels inclosed within the plug in communication with the ink-channel 4 and with the ink-reservoir, and an air-vent in communication with the ink-channel and the capillary feeding-channels at the junction thereof, substantially as shown and described.

20. In a fountain-pen, a feed-plug or ink-duct having an ink-channel 4 in communication with the pen, one or more inclosed capillary feeding-channels in communication with the ink-channel and with the ink-reservoir, and an air-vent in communication with the ink-channel and the capillary feeding-channels at the junction of the same, such air-vent being in communication with the air at both ends, substantially as shown and described.

21. In a fountain-pen, a feed-plug having an ink-channel 4 in communication with the pen, one or more capillary feeding-channels in the form of slits of less width than height in communication with the ink-channel and with the ink-reservoir, and inclosed within the plug, and an air-vent in communication with the passage formed by the ink-channel and such capillary feeding-channels, substantially as shown and described.

22. In a fountain-pen, a feed-plug or ink-duct having an ink-channel 4 in communication with the pen, a plurality of capillary feeding-channels consisting of narrow slits

in communication with one another along the entire length thereof at or near the center of the plug and in communication at one end with the ink-reservoir and at the other with the ink-channel 4, and an air-vent in communication with the capillary feeding-channels and with the ink-channel at the junction thereof, substantially as shown and described.

Signed at the city and county of New York, in the State of New York, this 22d day of 10 March, A. D. 1894.

BENJAMIN VANDEMARK EATON.

Witnesses:

AUBREY ISON,
H. G. HARRIS.