

(No Model.)

H. A. WALKER.
FOUNTAIN PEN.

No. 467,785.

Patented Jan. 26, 1892.

FIG. 1



FIG. 2

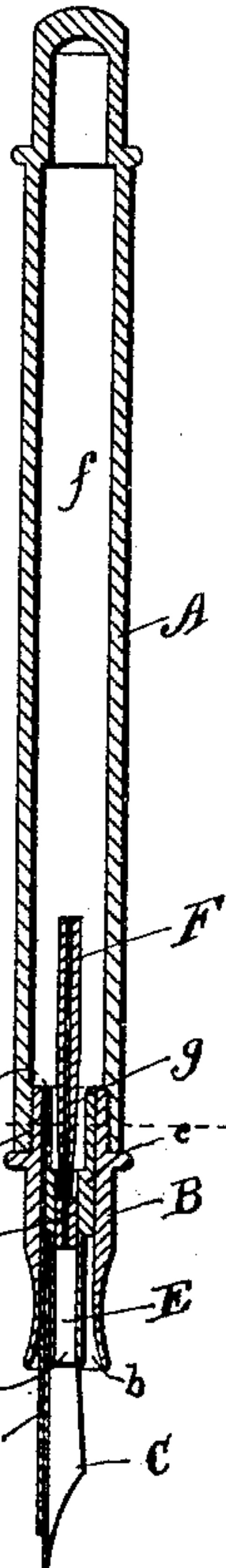


FIG. 3

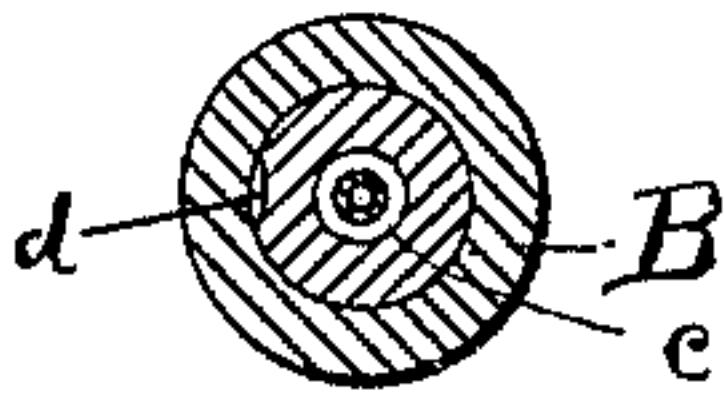
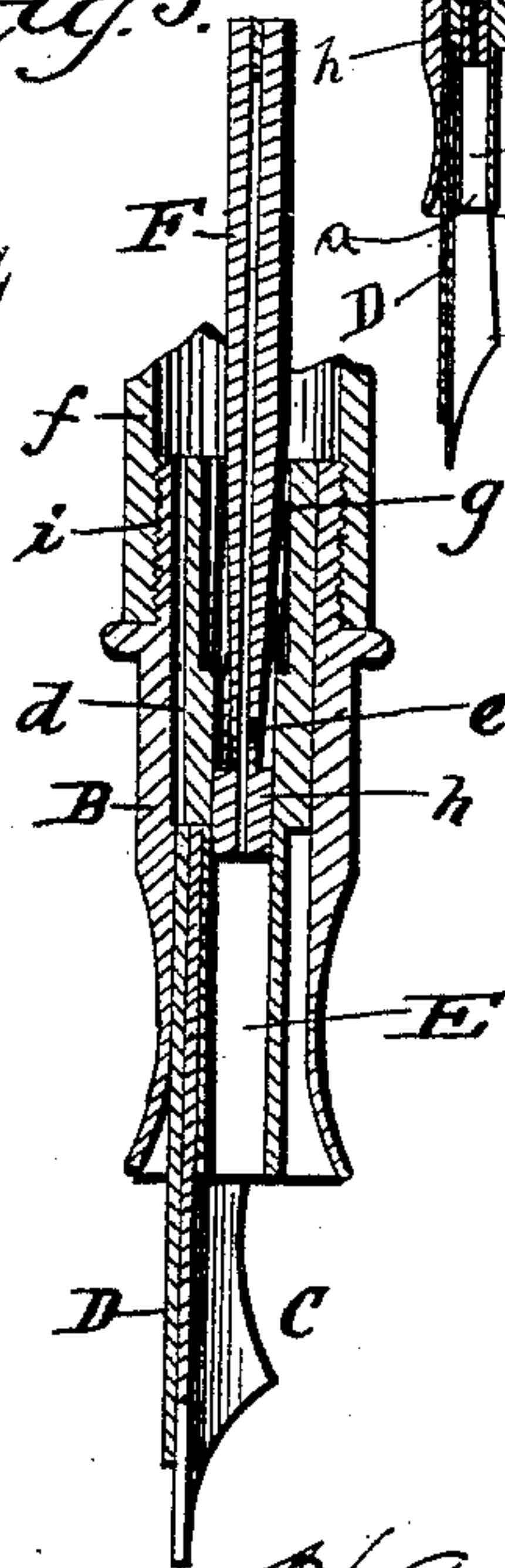


Fig. 5.

FIG. 4



Witnesses

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FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 467,785, dated January 26, 1892.

Application filed April 16, 1891. Serial No. 389,180. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. WALKE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to fountain-pens of the class having tubular holders which constitute reservoirs, from which the ink is automatically supplied to the pen-point during the act of writing.

The objects I have had in view have been to produce a pen whose supply of ink to the point shall be uniform while in use and which shall be automatically cut off and leakage prevented immediately upon the removal of the pen from the paper; to so regulate and control the supply of ink to the point that the same may be increased or diminished at the will of the user, so that a greater or less quantity of ink may be used as desired, and, finally, to provide means to prevent too great a flow when the reservoir is nearly empty, which, with pens as ordinarily constructed, occurs because of a too free admission of air into the reservoir, so that an excessive pressure is caused upon the ink therein. These objects I attain by the pen having the construction and combination of parts hereinafter specified and illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of a pen of my construction; Fig. 2, a longitudinal central section thereof; Fig. 3, a transverse section on the line $x x$ of Fig. 2; Fig. 4, a detail view, partly in elevation and partly in section, of a section or part of the air-tube I use in my pen; and Fig. 5, an enlarged central section of the lower part of the pen.

Similar letters of reference indicate like parts throughout the several figures.

The holder is, as usual with pens of the class to which my invention pertains, made in two parts or sections united by a screw-joint at i . The upper longer section A is made tubular or hollow and hermetically closed at its upper end, and the lower section B is likewise made tubular, but is open from end to end. Contained within the latter section is the lower section E of a two-part air-tube, which section

E has the same length as the holder-section containing it, and has such diameter at its upper portion for about one-half its length as to tightly fit the bore of said holder-section, while for the remainder lower half of its length its diameter is reduced to form an annular space with the wall of the holder-section B, in which space is placed the pen-point C and the ink-conductor D, both of usual construction. By flattening the upper larger portion of the section E for its entire length, a space d , forming an ink-duct to convey ink from the reservoir to the conductor D, will be left between such flattened portion and the adjacent concave interior surface of the holder-section B. For about one-third its length from its upper end downward the air-tube section E has as great diameter internally as can be given it without breaking into the ink-duct d , while for the remainder of its length its internal diameter is decreased. Within the latter and having such diameter as to fit it so tightly as to form a frictional joint therewith is the lower end of the other air-tube section F, whose length is such that it projects up into the reservoir f above the upper end of the holder-section B. The upper end of the section F is closed; but its lower end is open. Externally its shape at its lower end for a comparatively short distance—sufficient, however, to form a joint, as above described—is cylindrical when its diameter is abruptly reduced, from which point upward for about one-half its length it is made tapering, gradually increasing in diameter until it has the same diameter as the portion forming the joint, from which point to its upper end it is again cylindrical. An opening e perforates the wall of said upper section F, just above the shoulder formed by its reduction in diameter, through which small bubbles of air can pass from the interior of said section into the space between it and the lower section E, thence through such ink as the reservoir may contain into the space therein above such ink and relieve the partial vacuum which may exist in consequence of the outflow of ink.

The operation of my pen as above constructed is as follows: The reservoir f being filled and the pen used, ink will pass from said reservoir through the duct d to the conductor D, from which the ink is conveyed in consequence

of capillary attraction and the motion of the pen to the paper. Upon lifting the pen from the paper and stopping its motion the flow of ink will immediately cease. In its passage from the reservoir when in use the flow of ink is controlled by the two-part air-tube E and F, through which, by means of the opening *e*, air is discharged in small bubbles into the reservoir. If the ink does not pass to the pen-point freely enough in consequence of the formation of a partial vacuum the flow will be expedited by the admission of air into the space in the reservoir above the ink, while if it flow too freely the inward passage of air-bubbles will tend to check its flow. The section F of the air-tube is made adjustable in the other section, so as to enable different rates of flow to be effected simply by adjusting said section farther in the section E or farther out, so as to change the position of the opening *e* and to vary the size of the space around the same. The latter will occur because of the tapering portion of said section, for, as will be obvious, when raised the space will be formed by the walls of the section E and the smallest portion of said section F, while when lowered a portion of greater diameter will with said walls form the space. The result upon the flow of ink by lowering the upper section is to produce a light flow, as by lowering the opening *e* the air-bubbles passing therethrough will have a long distance to pass through the body of ink in the reservoir, and there will be a retardation of said bubbles, while, in consequence of the reduction of the space between the walls of the two sections, as above described, the volume of air will be diminished, as only small bubbles thereof will form and ascend to the space in the reservoir above the ink, causing, of course, a lighter pressure upon the latter. By raising the section F, exactly opposite conditions will ensue, so that the flow of ink will be heavier. Owing to the form of connection between the parts E and F, the adjustment of the latter can readily be effected. When the quantity of ink in the reservoir is considerably diminished and the same is nearly empty, with pens as ordinarily made the outflow of ink increases, owing to the pressure of the large volume of air in the reservoir. With my pen this objection is obviated by preventing the too free admission of air to the latter. This is accomplished by the provision of the large tubular cavity *g'* in the air-tube section E, which forms a cup containing from five to twenty drops of ink apart from that in the duct *b*, through which the air-bubbles have to pass before reaching the reservoir, being thereby retarded, as they would not were no such cup provided, so that the air could enter the reservoir directly.

It will be seen from the foregoing that the gist of my invention consists in as perfectly as possible regulating and controlling the admission of air to the ink-reservoir, for, as will be readily understood, this is an important

factor to be taken into consideration in making a successfully-operating fountain-pen.

Besides its important function as an air-controlling device the lower section E of the air-tube also, together with the lower holder-section B, operates to provide means for securing the pen-point and conductor in place and in forming the ink-duct *d*.

Quite an important advantage accruing from the separation and independence of the ink-duct *d* and the air-tube is the fact that foam composed of ink and air cannot form in the ink-duct to obstruct the free outflow thereof of ink, as is the case in those forms of pens where the outflowing ink and inflowing air have both to use the same channel or duct.

Besides being most satisfactory in operation my pen is exceedingly simple in construction, so enabling it to be cheaply made and sold and not liable to get out of order. Its parts are easily accessible for cleaning and repair should the latter be necessary.

What I claim is—

1. The combination of a reservoir-holder closed at its upper end and open at its lower end and having a lower tubular section secured in its open end, an air-tube fitted in this latter section and communicating with the ink-reservoir, an independent ink-duct formed between the air-tube and holder and leading to the pen-point, a pen-point clamped between the air-tube and holder, and a conductor, substantially as and for the purpose described.

2. The combination, in a fountain-pen, of a reservoir-holder closed at its upper end and open at its lower end, an air-tube fitted in the holder and communicating with its interior, and another air-tube having its lower open end inserted in the said air-tube and its upper end extending into the reservoir, an air-opening being formed in this latter tube above its lower end and communicating with the space between the two air-tubes, substantially as and for the purpose set forth.

3. In a fountain-pen, the combination of a reservoir-holder, an air-tube fitted in the open end of said holder and communicating with its interior, and another air-tube having its lower open end fitted adjustably in the said air-tube and its upper closed end extending into the reservoir, the latter air-tube being provided with an air-opening above its lower end communicating with the reservoir, as and for the purpose described.

4. In a fountain-pen, in combination with a suitable reservoir, an air-controlling device consisting of a tube having a bore of greater and less diameter and a second tube having a cylindrical portion tightly fitting the less diameter of the bore and an abruptly-reduced and upwardly-tapering portion and having an opening communicating with its interior and with the bore of the other section, substantially as described.

5. In a fountain-pen, the combination of a

reservoir-holder, an air-controlling device consisting of an air-tube inserted in the open end of the holder and communicating at its upper end with the reservoir, and another
5 tube having its lower end open and fitted snugly in the upper end of the other tube and also having a portion of its body reduced in diameter between its ends, an air-opening being formed in this latter tube, substantially
10 as described.

6. In a fountain-pen, the combination of a reservoir-holder, an air-tube fitted in the open end of the holder and communicating with the reservoir thereof, a cavity *g* being formed
15 in its upper end, and another air-tube in the first-mentioned air-tube, having its bore in communication with the bottom of said cavity, as and for the purpose set forth.

7. In a fountain-pen, in combination with
20 the adjustable two-part tubular holder, the

air-tube within the lower part of said holder having a portion of its length reduced in diameter to form with the wall of such holder part a space for the reception of the pen-point, substantially as described.

8. In combination with a fountain-pen, an air-controlling device consisting of a tube having a bore of greater and less diameter, a second tube secured adjustably in the latter part of said tube and communicating with its
30 bore through a suitable opening, and the independent ink-duct formed by flattening the surface of said first tube, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

HENRY A. WALKE.

Witnesses:

L. D. HELLER,
JESSE HUESTIS.