

(No Model.)

2 Sheets—Sheet 1.

W. W. STEWART.
FOUNTAIN PEN.

No. 351,718.

Patented Oct. 26, 1886.

Fig. 1.

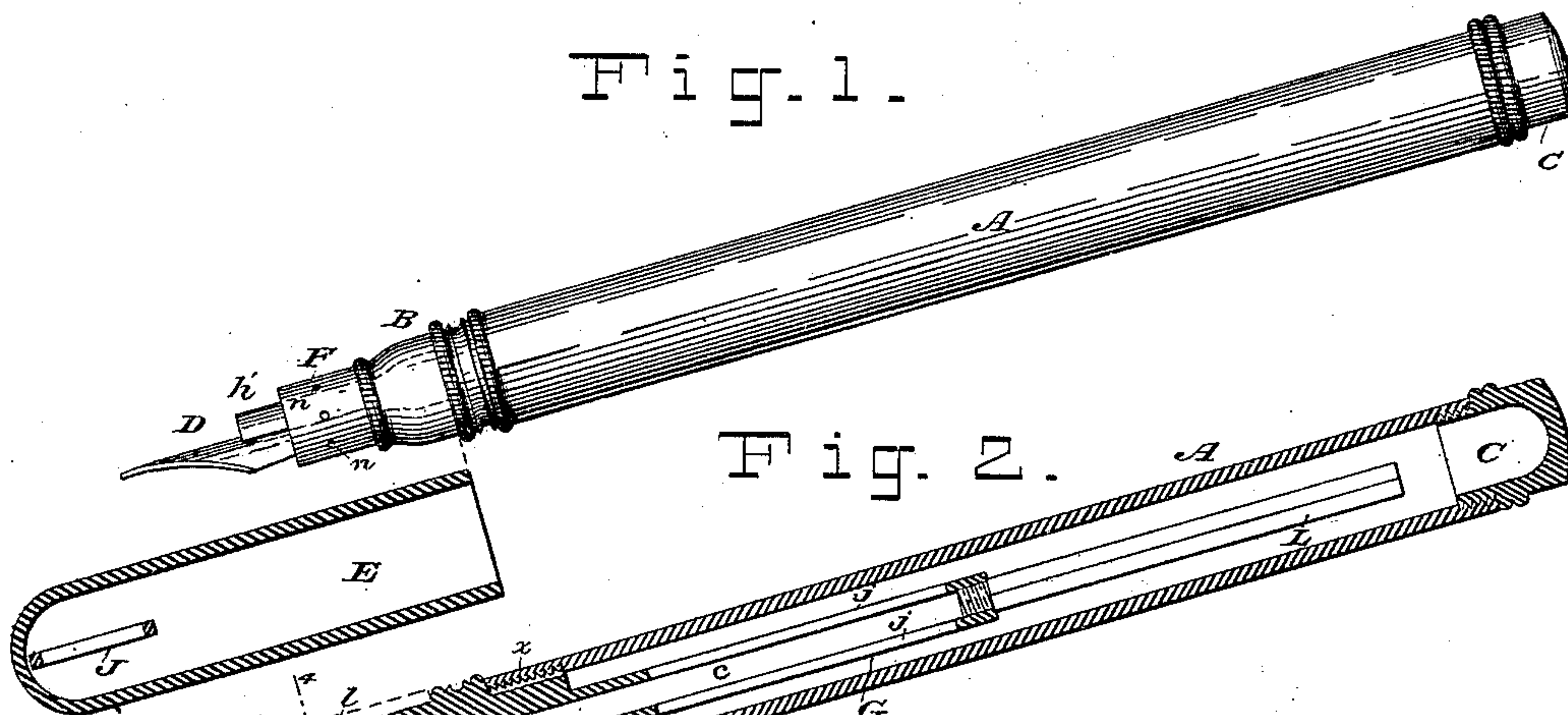


Fig. 2.

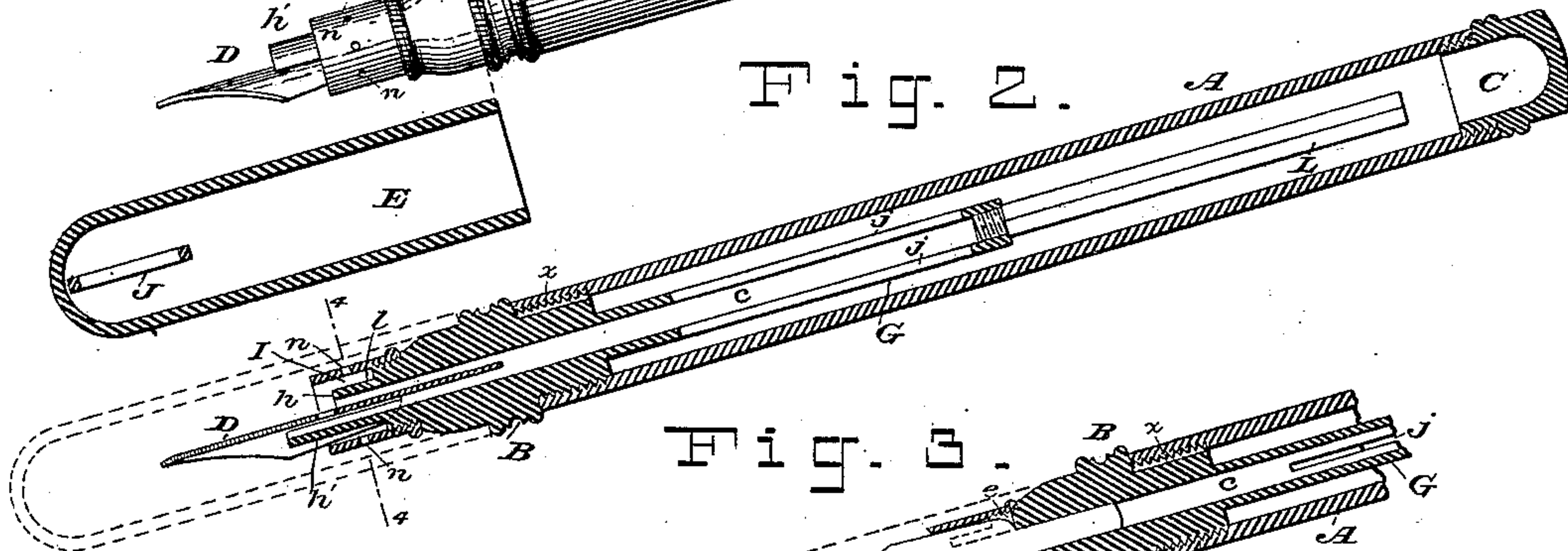


Fig. 3.

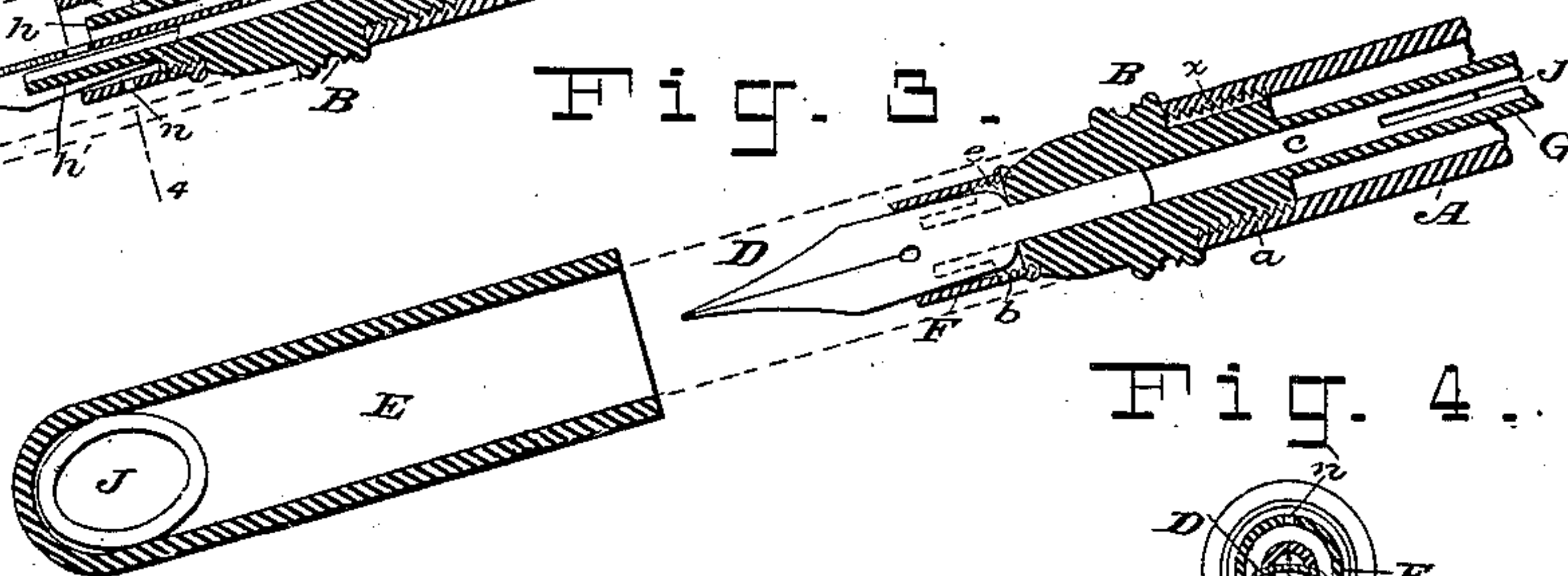


Fig. 4.

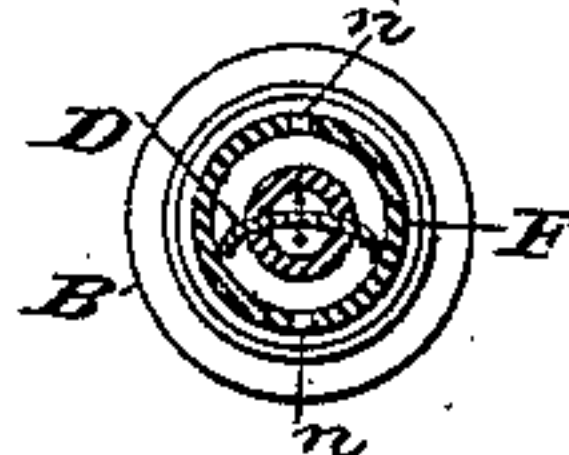


Fig. 5.

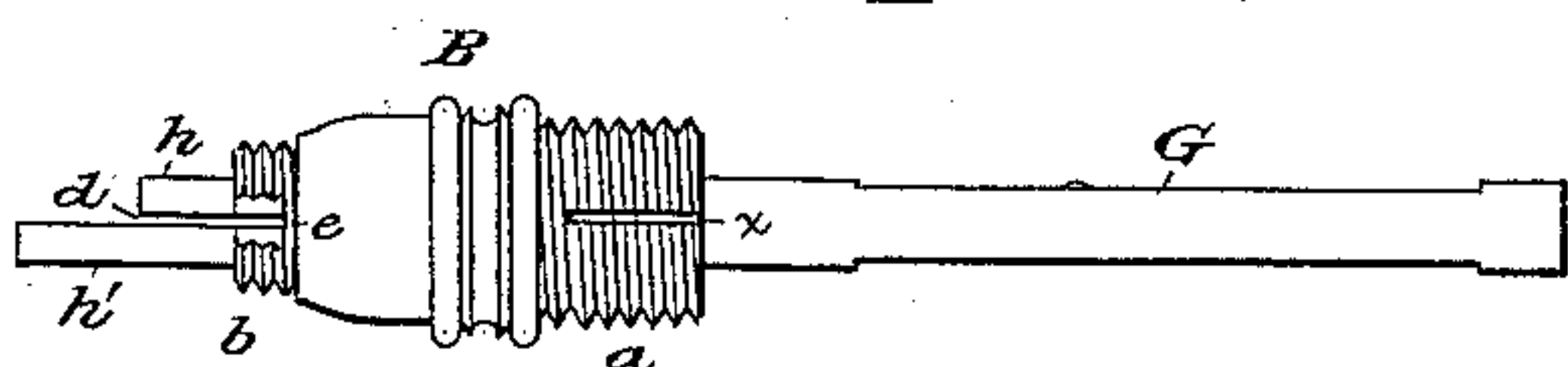


Fig. 6.

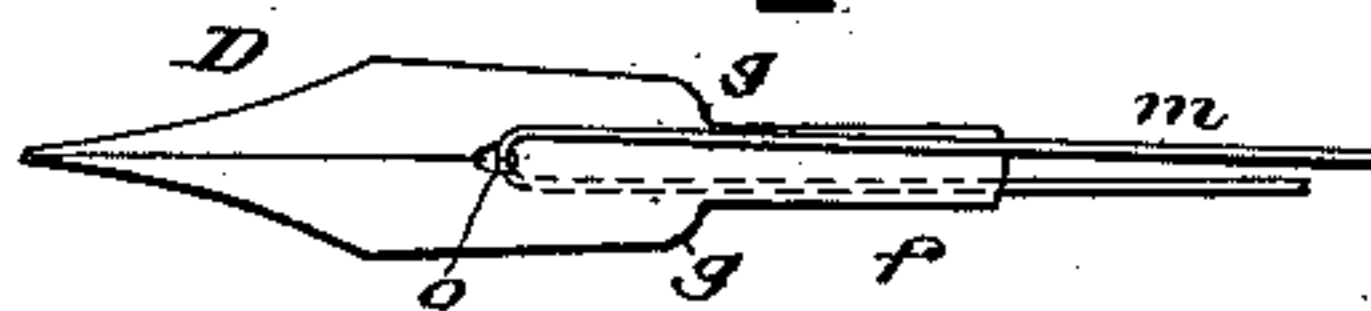


Fig. 7.

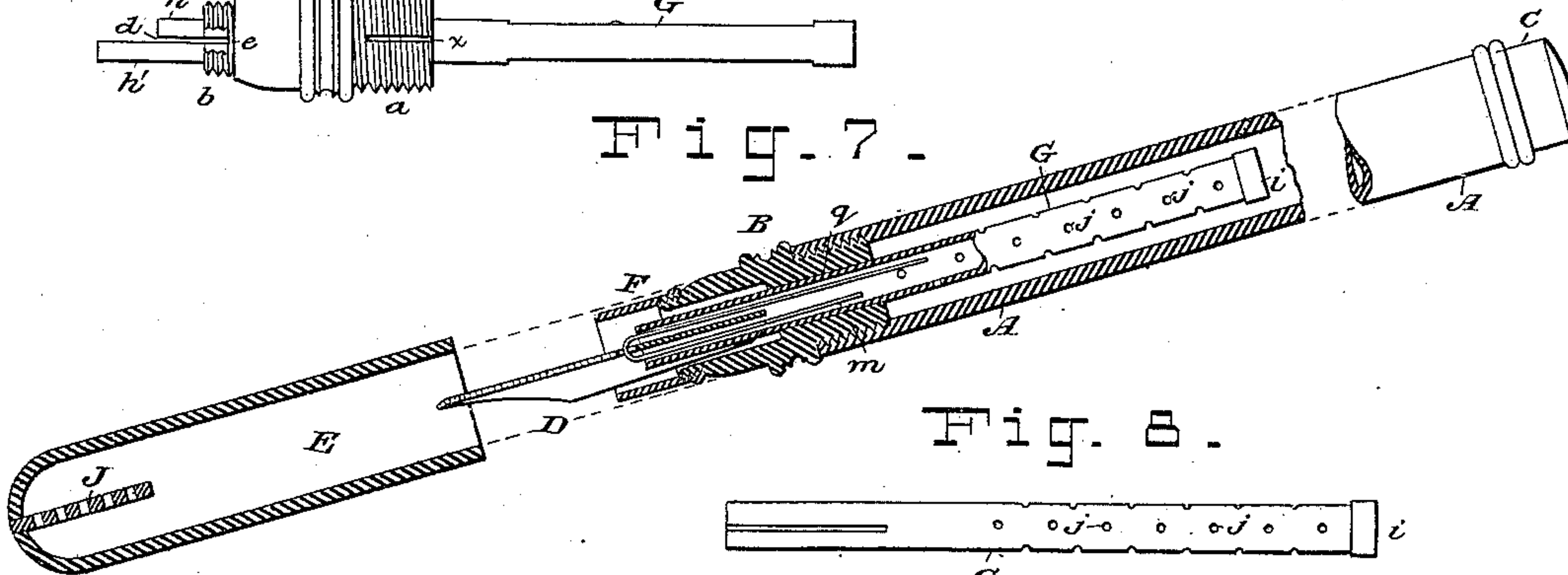
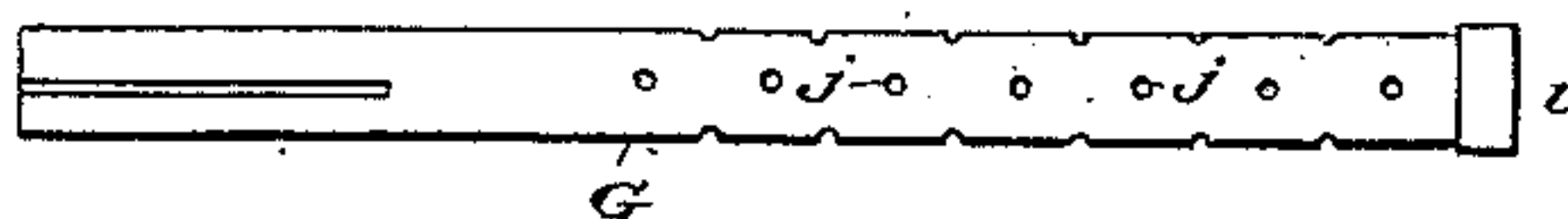


Fig. 4



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23 unter James Kenneth

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Fig. 9.

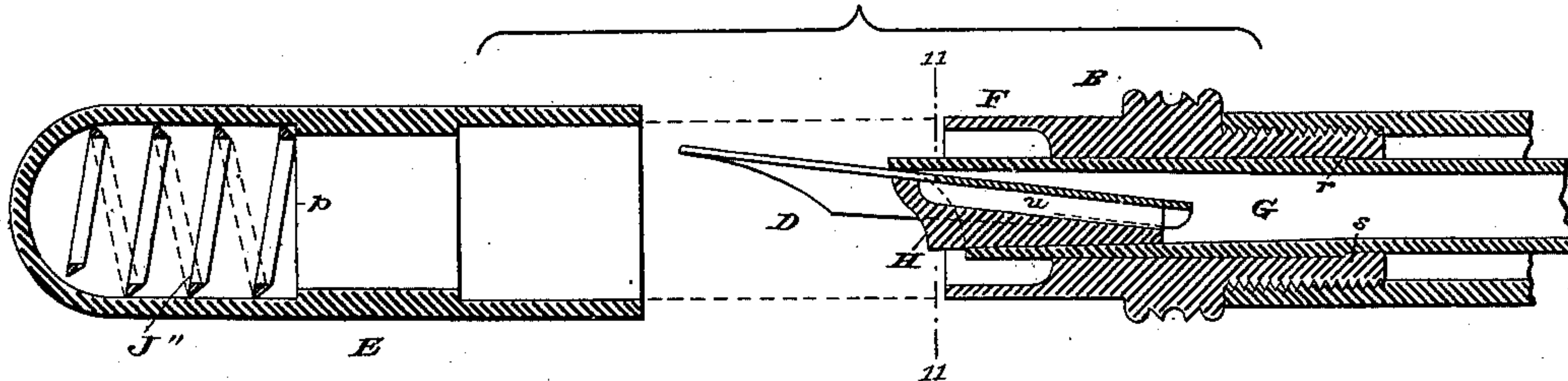


Fig. 10.

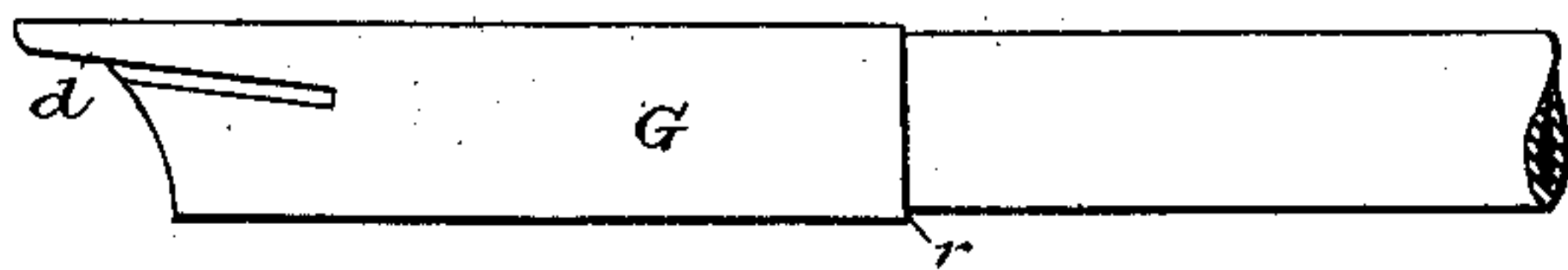


Fig. 11.

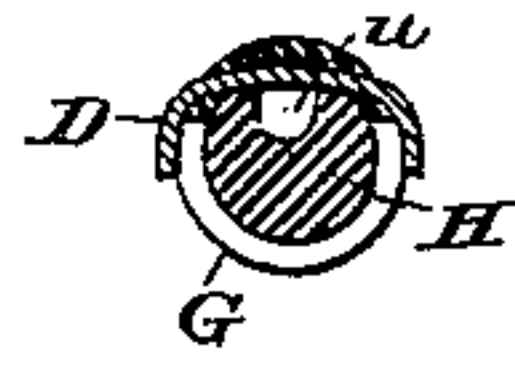


Fig. 12.

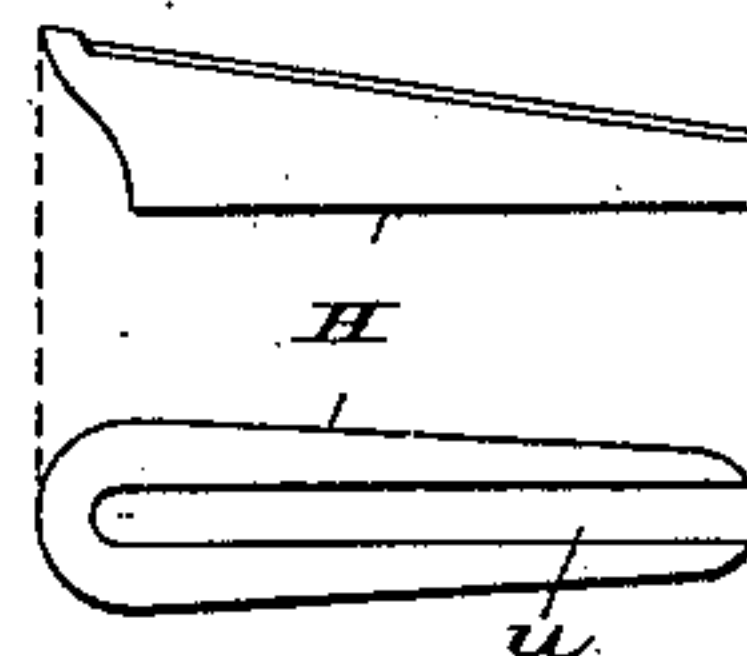


Fig. 13.

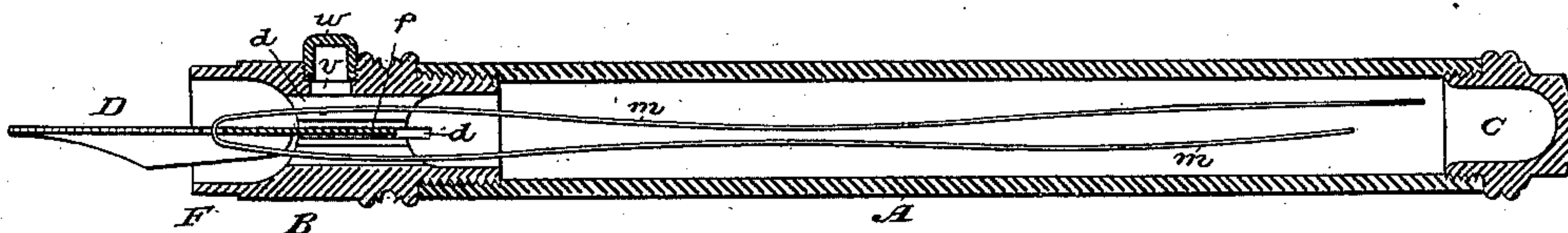


Fig. 14.

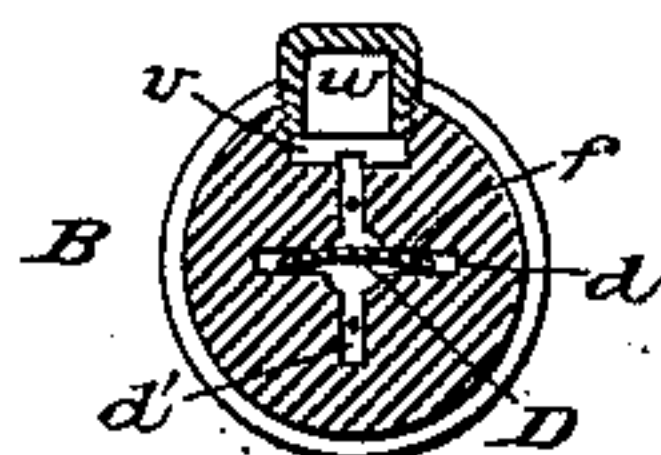


Fig. 17.

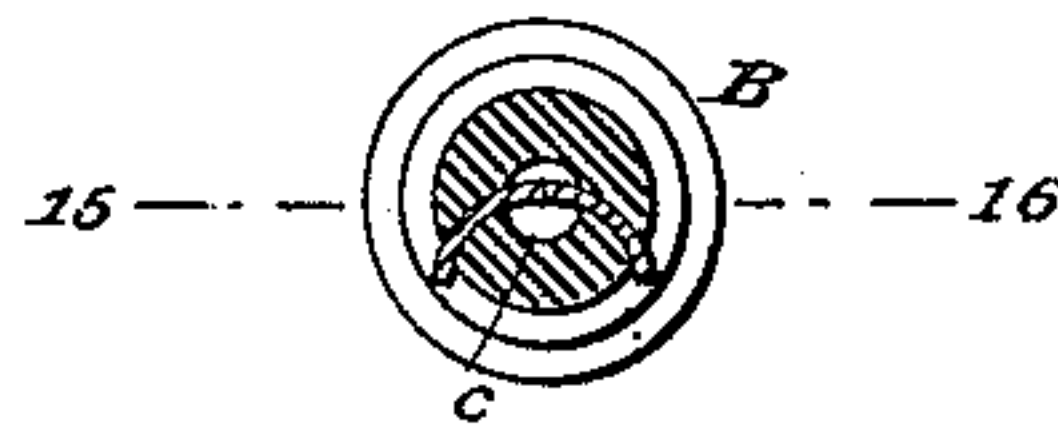


Fig. 15.

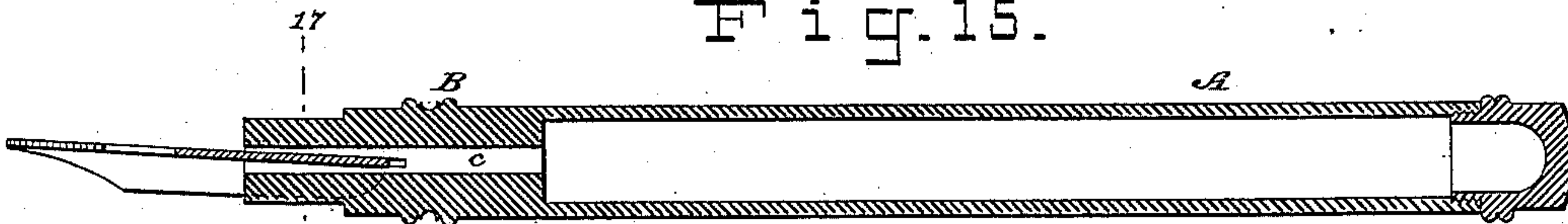
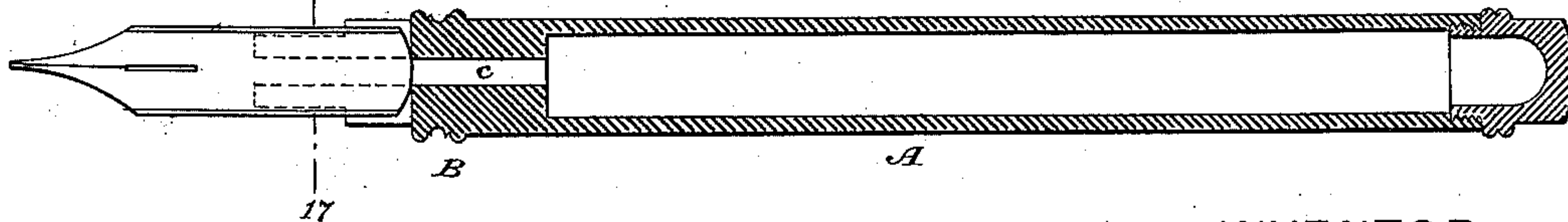


Fig. 16.



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UNITED STATES PATENT OFFICE.

WILLIAM W. STEWART, OF BROOKLYN, NEW YORK.

FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 351,718, dated October 26, 1886.

Application filed March 5, 1886. Serial No. 194,121. (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-Pens, of which the following is a specification.

This invention relates to those pens having an ink-reservoir in the holder with a duct or ducts for ink or air leading down from such reservoir to the pen or pen-nib.

The improvements pertain to the pen itself, to the ink-ducts, to the nozzle, and to the protecting cover or cap.

Figure 1 of the accompanying drawings is an elevation of the preferred construction of pen, the cover being shown detached and in section. Fig. 2 is a longitudinal mid-section of the pen. Fig. 3 is a fragmentary longitudinal mid-section, looking-down, showing the nozzle, pen, and cover. Fig. 4 is a transverse section cut on the line 4 4 in Fig. 2. Fig. 5 is a side elevation of the nozzle detached, and Fig. 6 is a plan view of the pen-nib removed. The remaining figures illustrate modifications. Fig. 7 is a longitudinal section, and Fig. 8 is an elevation, of the tube therein. Fig. 9 is a longitudinal section of another construction. Fig. 10 is an elevation of the tube therein. Fig. 11 is a cross-section on line 11 11 in Fig. 9, and Fig. 12 shows a wedge or key removed. Fig. 13 is a longitudinal section of a further modification, of which Fig. 14 is a transverse section on the line 14 14. Figs. 15 and 16 are longitudinal sections of the simplest form of my invention, and Fig. 17 is a transverse section on the line 17 17.

I will first describe the construction shown in Figs. 1 to 6. Let A designate the tubular holder or handle, forming the reservoir for the ink; B, the nozzle, which closes the lower end of the holder and holds the pen; C, the cap or plug which closes the upper end of the holder; D, the pen proper or pen-nib, and E the protecting cover or cap, which fits removably upon the nozzle and incloses and protects the pen-point when not in use. The nozzle B is made with a threaded portion, *a*, which screws into the holder A, and toward its front end it has another threaded portion, *b*, on which screws a tube, F, preferably of metal, which serves as the "tubular extension" or jacket

claimed in my Patent No. 237,454, dated February 8, 1881. The rear of the nozzle is formed with or has attached to it a tube, G, which extends a considerable distance into the reservoir. A bore, *c*, is formed entirely through the nozzle and this tube G. The front end or nose of the nozzle has a slit or kerf, *d*, sawed in it, extending back, preferably, into the threaded portion *b* and terminating at *e*, which forms a shoulder. The pen D enters this slit. The shank *f* of the pen is cut away on both sides to make it barely narrow enough to enter the bore *c*, and leaving shoulders *g g*, which, when the pen is inserted in the slit *d* and pressed back, strike the shoulder *e*. On one side of the slit *d* the nose of the nozzle forms a duct or gutter, *h*, and on the other side it projects farther and forms a similar but longer gutter, *h'*. The pen may be turned either side up, so that the gutter *h'* will come on top, as shown in Fig. 1, or underneath, as shown in Fig. 2. This is desirable for different kinds of pens, as with some pens it is preferable to have the longer duct on top, while with some others it is best to have it beneath. The tube G should be closed at its upper or rear end by a plug, *i*, or otherwise, and it has a slit or slits, *j*, sawed in it, or is provided with a number of small perforations, as shown in Fig. 7. The slits are so narrow as to exert a capillary attraction, whereby they serve to regulate and retard or control the flow of the ink from the reservoir down to the pen and of air from the pen up into the reservoir. The interior or bore of the tube G thus constitutes a "condensing-chamber," equivalent to the chambers shown in my previous patents. When the pen D is in place in the slit *d*, its shank *f* projects some distance into the bore *c*, and divides it longitudinally into two nearly equal portions. The bore *c* is thus divided into two ducts—one extending down on top of the pen and the other extending down beneath the pen. The ink flowing down is cut or divided by the heel of the pen, converting it into two streams, each of which flows then through a smaller duct or passage, so that it is more fully under the influence of capillary attraction. These smaller ducts or passages are semi-cylindrical in cross-section, the half-round wall being of hard rubber, which is softened by the soaking action of the ink, and serves as an attractive surface

for the fluid, while the approximately-flat wall is formed by the gold pen itself, the polished metal surface of which acts as a repellent of the fluid. I thus utilize the principle of combined attractions and repellents, or absorbent and glazed surfaces, set forth in my Patent No. 253,953, dated February 21, 1882. The division of the bore *c* by the shanks of the pen has the further advantage of facilitating the passage of the down-flowing ink and the ascending bubbles of air. The former will ordinarily monopolize one duct, while the latter will confine itself to the other. At times the ink will flow down the upper duct, while the air ascends beneath the pen, and at other times their positions will be reversed.

The division of the bore or duct or passage leading down from the reservoir, by the projection of the shank of the pen into it, is the leading feature of my present invention.

Referring to Fig. 2, *l* is a hole in the nose, through the gutter *h*. This affords communication from the rear of the chamber or inclosed space *I*, formed within the jacket *F*, to the duct in the gutter *h*. It frequently happens that an excess of ink will run down toward the pen and be attracted up into the chamber *I*. It remains in this chamber until drawn off in writing; or, if the necessary conditions occur, it flows through this hole *l* back into the duct. When the pen is inverted, this ink will usually flow back in this manner. Holes *n n* are formed in the jacket *F* to admit air and afford lateral ventilation for the chamber *I*.

Referring to Fig. 6, the pen is provided with a slender wire, *m*, bent double, in the form of a hair-pin, with its bend passed through a hole, *o*, in the pen, and its straight portions or legs extending back longitudinally along the shank of the pen. The legs of the wire *m* pass through the half-round ducts above and below the pen, as shown in Fig. 4, and their ends extend into the undivided portion of the bore *c* beyond the heel of the pen, as shown in Fig. 7. The wire *m* is omitted from Figs. 2 and 3 for the sake of clearness. Its function is to keep the half-round ducts from choking up, by acting as an "irritant" to the fluid. A bristle might be substituted for the wire, or a thread or other permeable strand might be used in place of either. The end of the tube *G* is closed by a bar, *L*, of wood or other absorbent substance which can be thoroughly soaked or softened by the ink and yet will retain its shape and hold itself in place. This bar extends nearly or quite through the holder or ink-reservoir, and when the pen is in use projects into the part of the holder which usually contains air, thus serving to keep the air moistened with ink and to prevent its escape from the condition of bubbles or froth. It also acts to hold the mass of ink in the holder under capillary influence, preventing its too free movement.

In order to obviate the cementing fast of the nozzle *B* where it screws into the holder *A* by the drying of the ink in the screw-threads *a*,

I cut a groove or slit, *x*, Fig. 5, extending across the screw-threads. I thus form a duct or channel leading from the interior of the reservoir, which may conduct the water or solvent of the ink into the screw-threads, thereby keeping the interstices thereof filled with fluid and preventing the drying of the solid portions of the ink therein.

The protecting-cover *E* of fountain-pens as ordinarily constructed is a simple cap, which fits over the nozzle *B* when the pen is carried in the pocket, and fits upon the plug *C* when the pen is in use. It has been found that while carrying the pen in the pocket a small quantity of ink occasionally finds its way up into this cover, and thence into the space between the cover and the nozzle *B*, so that when the cover is removed a film of ink is found upon the nozzle, thus either soiling the fingers of the writer or giving him the trouble of wiping it off. To obviate this difficulty I provide the interior of the cover with some sort of capillary surfaces or interstices for attracting to themselves and retaining any ink which may enter the cover, or any fluid which may condense therein. In the construction shown in Figs. 1 and 3 the cover is simply provided with a ring, *J*, of hard rubber or other suitable material, which fits tightly into it and is forced in edgewise, as shown. This ring should be somewhat larger than the interior of the cover, so that it is compressed into elliptical form therein, whereby it tends to remain in a longitudinal position, instead of turning crosswise. I find that this simple expedient entirely obviates the objection referred to, so that on removing the cover the nozzle *B* is clean and dry.

Fig. 7 shows a modified construction of the cover. Its rounded head is sawed through, and in the kerf a flat plate or partition, *J'*, is placed, being cemented in place and finished off upon the outside, so that it does not show. The plate *J'* has numerous small perforations. The effect is much the same as when the ring *J* is used; but as the latter is simpler and cheaper I prefer it. Fig. 9 shows a helix, *J''*, inserted in a cover, *E*. The helix is preferably of hard rubber, although metal may be used. It is held in place by a shoulder, *p*, in the cover. Any construction or device for the interior of the cover which will afford capillary interstices or absorbent or attractive surfaces for holding the fluid which enters or condenses in the cover will answer the purpose and will be the equivalent of the devices shown.

Fig. 7 shows a slightly-modified construction of the fountain-holder. The nozzle *B* and tube *G* are not both in one piece, but are distinct pieces. The nozzle is formed with a throat, *q*, into which the tube *G* fits. This tube is shown detached in Fig. 8. It is a simple tube, preferably of hard rubber, slitted at its lower end at *d* to receive the pen, and having its upper portion perforated at *j j*, and closed by a plug, *i*, at its upper end. The slitted lower portion of the tube forms the

gutters h h' , which in this construction are shown of equal length.

Fig. 9 shows another modified construction. The tube G enters through the throat of the nozzle B, and has a shoulder, r , which encounters a shoulder, s , in the throat, to prevent the tube entering too far. The lower portion of the tube G is thus rendered larger, as shown in Fig. 10. This construction is adapted to larger pens than the construction shown in the preceding figures. The exterior of the tube G should have a diameter equal to the width of the inside flanks of the pen, so that they will fit together, as shown in Fig. 11. The slit d is formed diagonally, so that the point of the pen D is raised to about the position most common in pens, instead of being in the axis of the holder, as in Figs. 2 and 7. When the pen has been inserted, a wedge or key, H, (shown detached in Fig. 12,) is pressed in beneath it, thus not only wedging the pen fast in place, but slightly expanding the divided lower end of the tube G and causing it to bear tightly against the interior or throat of the nozzle B. The key H has a groove, u , in its upper side to serve as a duct for conveying ink down beneath the pen. The jacket F is here shown as formed in one piece with the nozzle B.

Figs. 13 and 14 show a modification, wherein the tube G is dispensed with. The nozzle B has two slits, d d' , sawed through it in planes crossing each other, forming a $+$, as shown in Fig. 14. The reduced shank f of the pen D is inserted into either of these slits— d , for instance—and the other slit— d' , for instance—is thus divided into an upper and a lower duct, to the same effect as already described with reference to Figs. 1 to 5. The wire or strand m passes through these ducts and extends up into the holder, as shown. A hole, v , is bored into the nozzle B from the top, and it is closed by a hollow screw-plug, w , thus forming a closed chamber or pocket, v , to hold a supply of ink or to provide a space where the air-bubbles or froth may collect and pass.

Figs. 15, 16, and 17 show the simplest construction of pen which involves the distinguishing feature of my invention. The nozzle B and tube A are both made in one piece. The slit d is sawed with a tubular saw, to fit a steel pen or a gold pen of like shape, as shown. The duct which is divided by the pen is a simple bore, c , through the nozzle. The jacket F is omitted.

The cover E and some other features of my present invention may be applied to stylus-pens without any material change.

I claim as my invention—

1. A fountain-pen constructed with a duct or passage extending down from the ink-reservoir, with the shank or heel of the pen arranged to divide such duct or passage, whereby ink or air may pass up or down along the shank of the pen, substantially as set forth.

2. A fountain-pen constructed with a duct or passage extending down from the ink-reser-

voir, and a longitudinal slit for the pen entering such duct or passage, whereby when the pen is inverted in said slit its shank divides the duct or passage, substantially as set forth.

3. A fountain-pen constructed with an ink-reservoir in the holder and with a cylindrical bore extending through the nozzle into the reservoir, and the heel of the pen entering said bore and dividing it into two semi-cylindrical ducts, the opposed surfaces of which are respectively the absorbent surface of the wall of the bore and the polished metallic surface of the pen, substantially as set forth.

4. A fountain-pen constructed with a holder, A, a nozzle, B, a tube, G, projecting into the holder and having a bore, c , through said tube and extending down through the nozzle, and a longitudinal slit, d , for the pen intersecting said bore, whereby when the pen is inserted in said slit its shank divides the ink duct or passage formed by said bore, substantially as set forth.

5. A fountain-pen constructed with a holder, A, a nozzle, B, an ink-duct extending from the reservoir in the holder down through said nozzle to the pen, and a reversible gutter, h' , leading down on top of or underneath the pen, substantially as set forth.

6. In a fountain-pen, the ink-duct intersected by a slit for the pen, whereby the insertion of the pen divides the duct, and the nose of the pen formed with a long gutter, h' , and a short gutter, h , extending on opposite sides of the pen, substantially as set forth.

7. In a fountain-pen, the construction of the nose with a slit for the pen, thereby forming two gutters for conducting the ink to opposite sides of the pen, and a small hole or vent, l , through the wall of one of said gutters, as described.

8. In a fountain-pen, the combination, with the holder, nozzle, and ink-duct, of the tubular extension or protecting-jacket F, inclosing the pen and forming a chamber or recess, I, within it around the pen, and provided with ventilating-holes n n , substantially as described.

9. In a fountain-pen, the combination, with the slitted or divided nose, of a pen-nib entering the slit therein and constructed with its shank f of reduced width, forming shoulders g g , substantially as shown.

10. In a fountain-pen wherein the ink-duct is divided by the insertion of the pen, the combination, with the pen and holder, of a doubled wire or strand, m , with its bend passed through a hole in the pen, and its legs extending into the duct, substantially as set forth.

11. A fountain-pen provided with a capillary-bar, L, of stiff absorbent material, fixed rigidly in place in the interior of the ink-reservoir, substantially as set forth.

12. A cover, E, for a fountain-pen, provided in its interior with capillary interstices for attracting and holding fluid that may condense therein, substantially as set forth.

13. A cover, E, for a fountain-pen, provided with a ring, J, inserted in it and forming capillary interstices for attracting and holding fluid, substantially as set forth.

5 14. A fountain-pen provided with a tube, G, extending into the ink-reservoir and serving as a duct to convey ink down to the pen, combined with a capillary-bar, L, of stiff absorbent material, fixed to the end of said tube and ex-

tending beyond the same into the upper part of the reservoir, 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,

GEORGE H. FRASER.