

No. 706,140.

Patented Aug. 5, 1902.

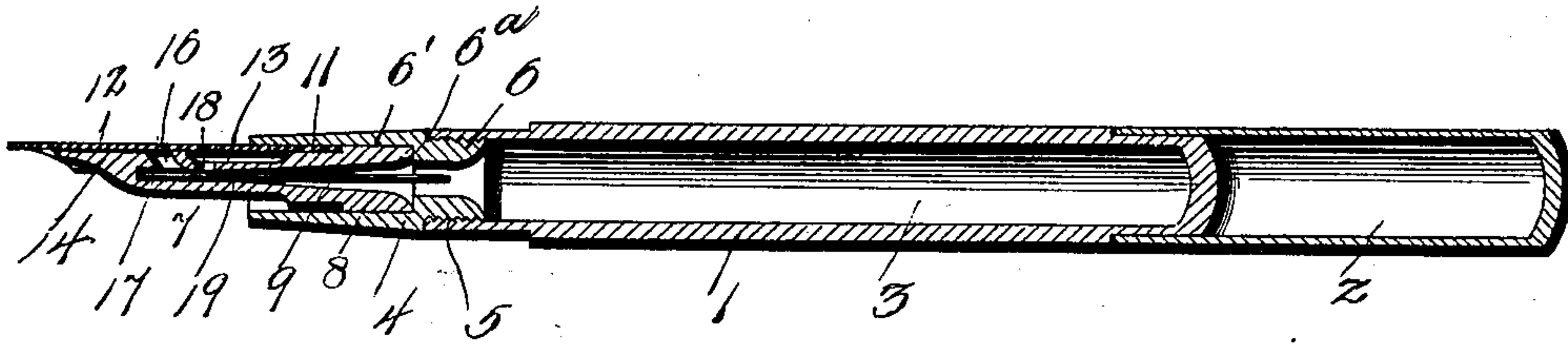
P. E. WIRT.  
FOUNTAIN PEN.

(Application filed July 12, 1901.)

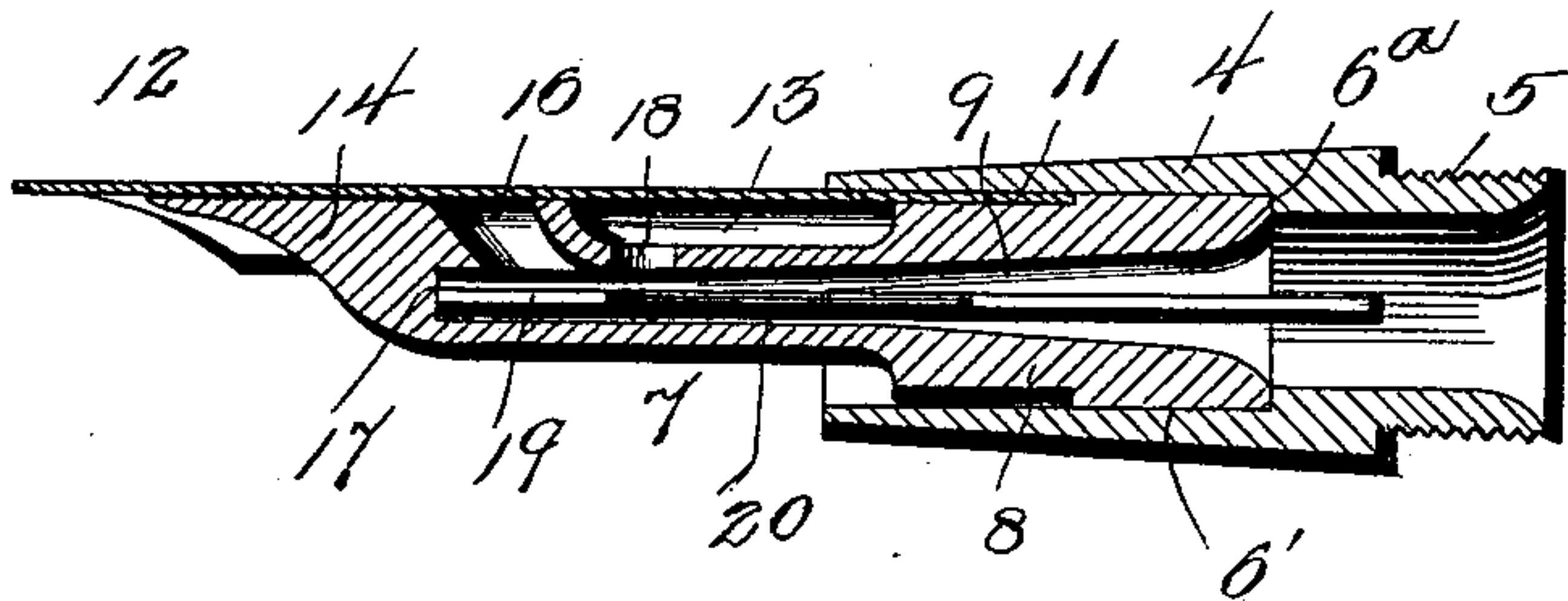
(No Model.)

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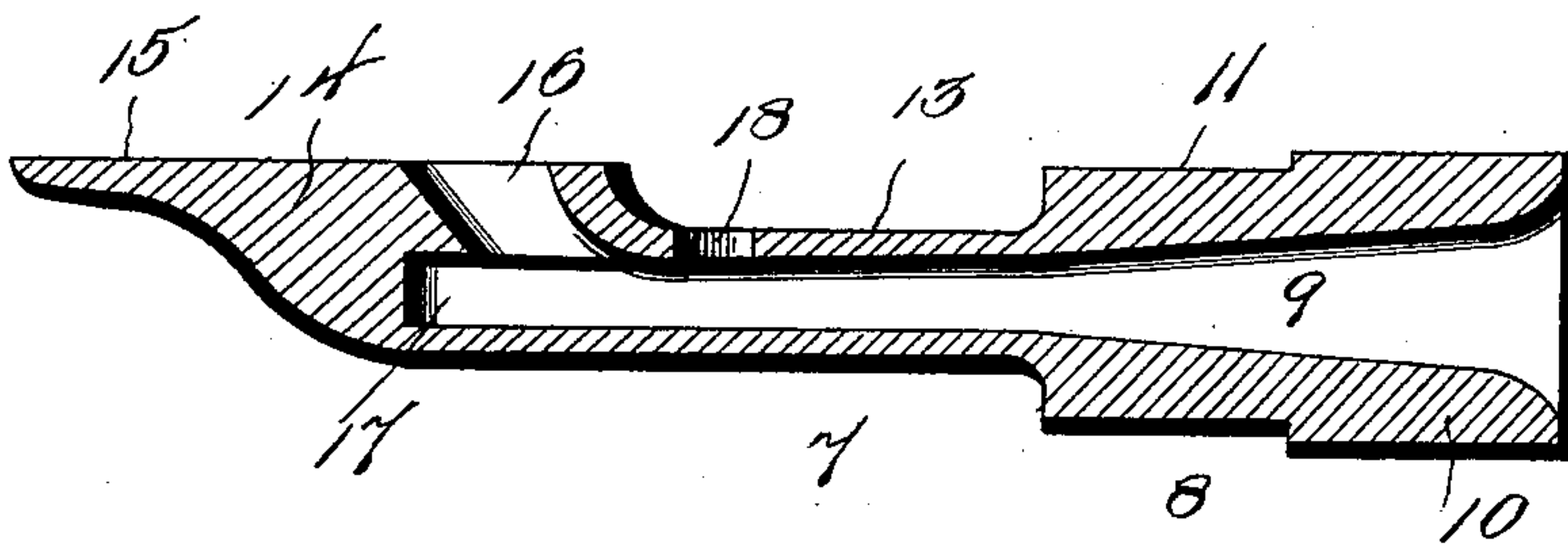
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses

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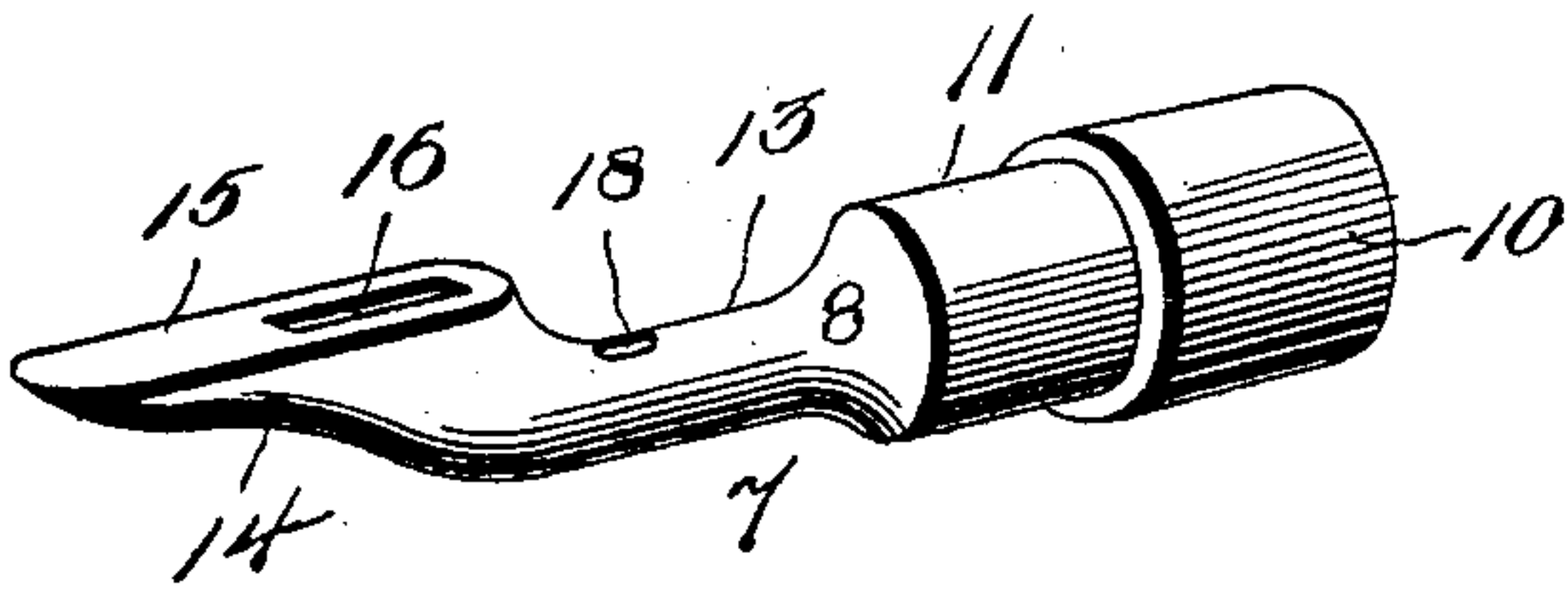
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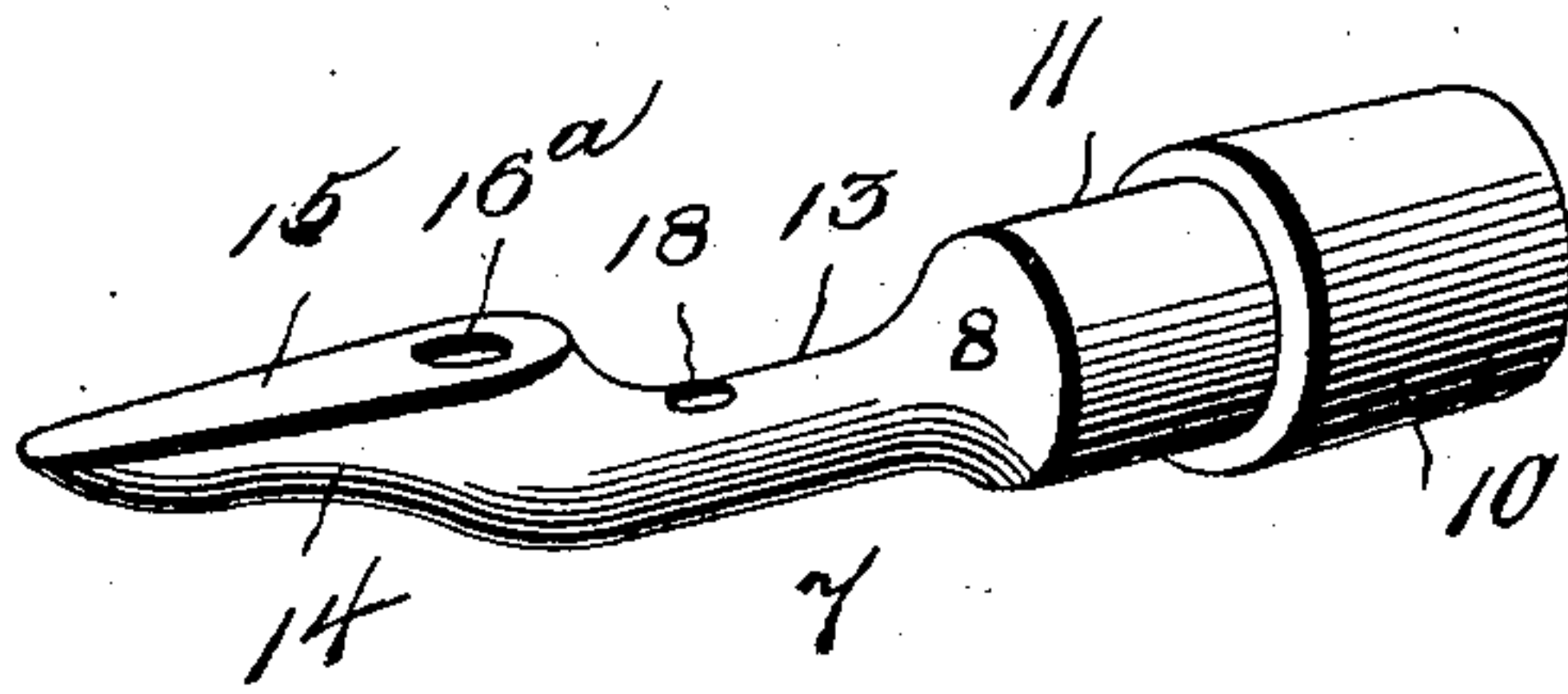
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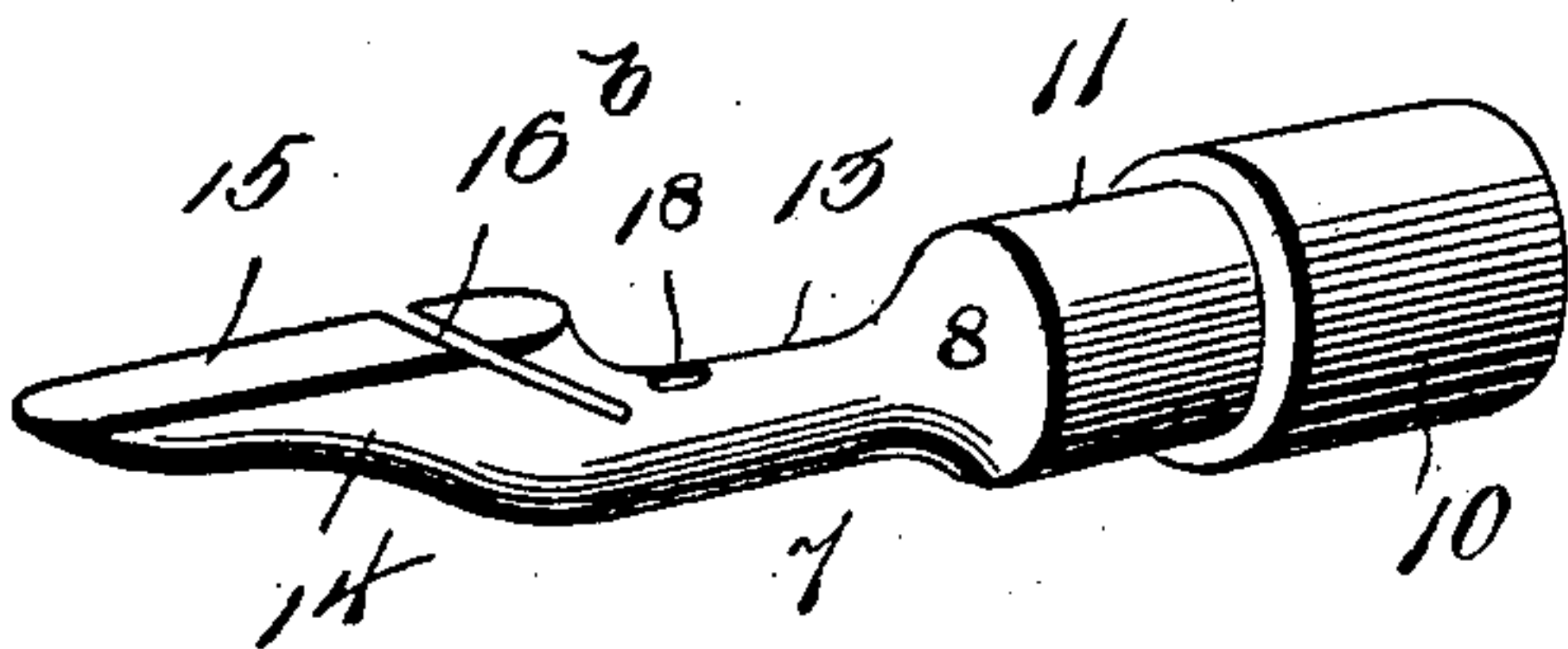
*Fig. 4.*



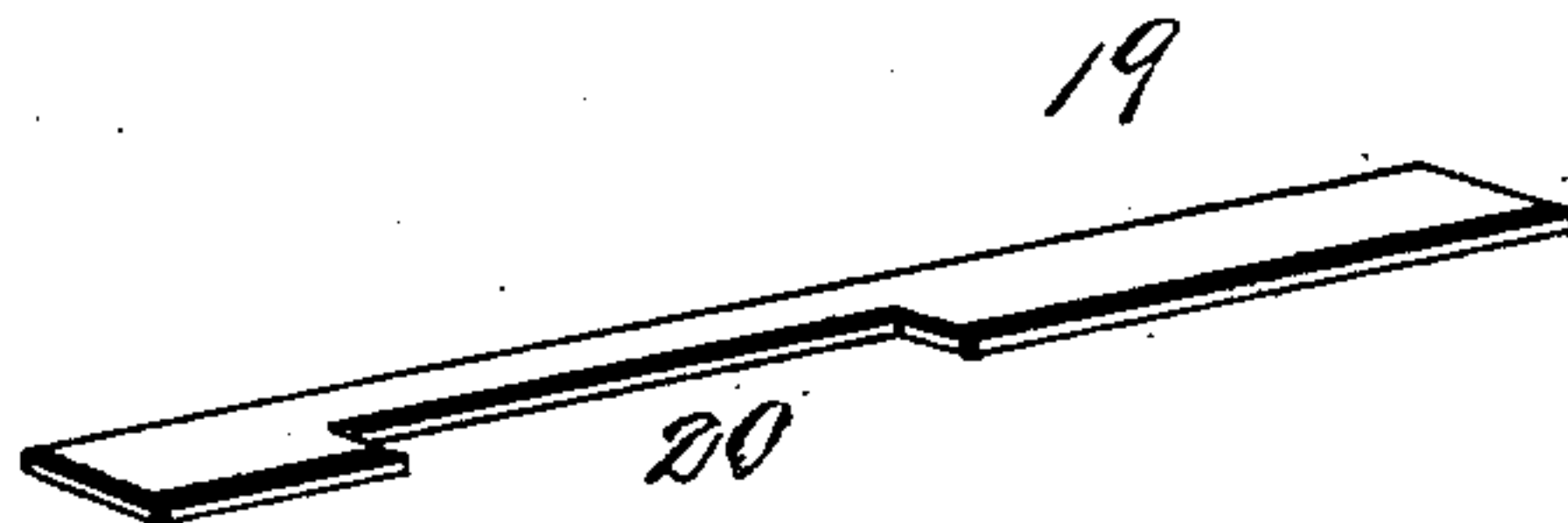
*Fig. 5.*



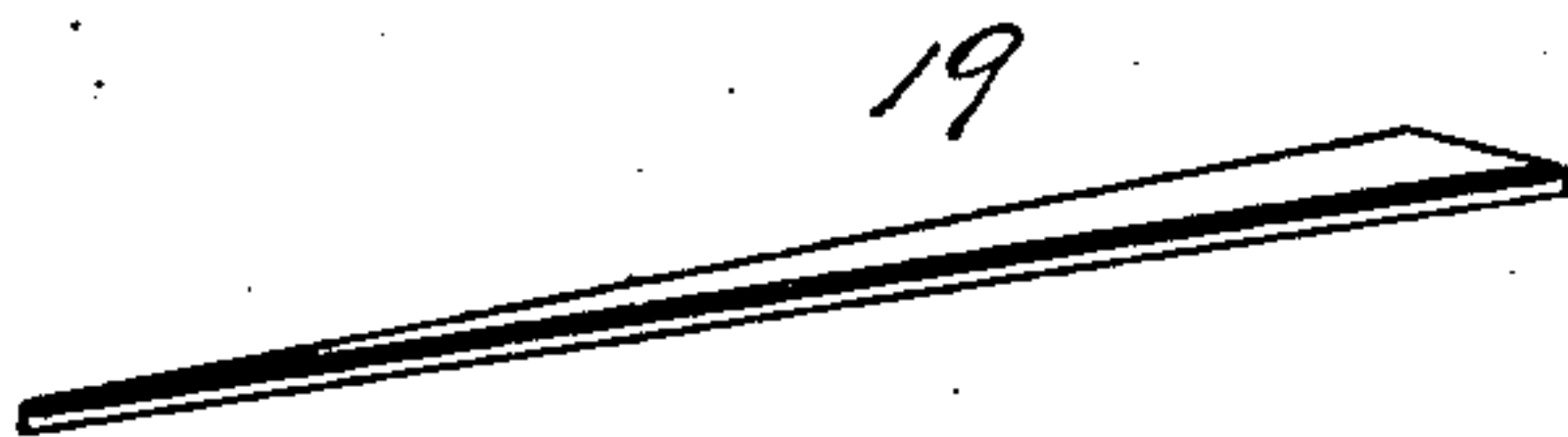
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

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## FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 706,140, dated August 5, 1902.

Application filed July 12, 1901. Serial No. 67,947. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL E. WIRT, a citizen of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

This invention relates to fountain-pens, and has special reference to that type of pens in which the flow of ink is controlled principally by capillary attraction; and the main object sought for is to provide improved feeding means for causing a more reliable flow of ink, principally by capillary attraction, to the pen-point for writing.

To this end the invention primarily contemplates in its general aspect a precise and delicate though positive provision of proper capillary attractive force exterior to the ink-supply, such as will compel the ink in proper quantity to leave the reservoir and allow air to enter in combination with a proportionately-defined ink-flowing fissure and an advantageously-located air-vent, whereby a well-working fountain-pen may be produced which will involve the most sensitive and regular pulsation of ink to the nibs when writing with the least possible chance of the pen flooding or skipping.

To provide a fountain-pen that positively obviates flooding or skipping is the perfection of the art and can only be accomplished by the most careful specific adjustment and relative positioning of the different elements constituting the working parts of the pen, and the present invention aims to provide a practical pen embodying as nearly as possible these exceedingly-desirable characteristics.

In the usual form of feeders for the under side of the pen or pen-point of a fountain-pen the feed-bar or feeder proper generally contacts throughout its entire length under the surface of the pen-point and carries the ink in an open groove or closed channel, while the air is admitted at some point or points well up upon the feeder or about the heel of the pen-point. This arrangement, though a common one, provides an uncertain capillary attractive force which is unnecessarily and wrongly provided all about the feeder or feed-bar as it lies against the pen, consequently causing the ink to oftentimes

flow too freely and producing flooding. There is no positiveness in such feeding means as to the amount of ink attracted, nor as to how, where, and in what quantity air is admitted to displace the withdrawn ink. In other words, the usual feed-bar or feeder clinging against the under side of the pen throughout provides no certain or positively-defined attractive area upon the outside of the feed-bar solely at the point required—namely, at the point of the pen. In other feeders embodying an open capillary duct extending longitudinally of the pen or having a closed duct or a partially-closed duct there generally exists an element of uncertainty in the regular flow of the ink by reason of poorly-defined capillary surfaces designed to draw the ink from an atmospherically-suspended column within the reservoir. It is well understood by those familiar with the art that ink will flow more readily from the pen-point if there is as little attraction as possible to hold it back after it is once attracted from the column within the reservoir, or, in other words, if there is as little attraction as possible about the feeder as it lies against the pen. This is exemplified by the greater proportion of fountain-pens, as it is often the case that ink will be quite abundant upon the body of the pen about a feed-bar of the usual kind, and yet the pen will skip or not write properly. This is due to the greater attraction for the ink about the feeder and the pen, where it will cling rather than be drawn, flow, or be attracted to the paper, as in writing.

The present invention comprehends feeding means constructed with a view of securing as perfect a balance of forces as possible—namely, to draw the ink out of the reservoir and hold it in sensitive suspension upon the nibs and at the same time to provide for the entrance of air through the diminishing ink column at a proper point. Also the invention contemplates a feeder whose attractive or capillary face is reduced to a minimum, so as to afford the least relation between the ink-supply within the reservoir and yet afford attraction enough to draw ink therefrom in ample quantity for good writing.

With these and many other objects in view, which will more readily appear as the



nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in the novel formation and disposition of the attractive surface of the feeder in conjunction with the ink-flowing fissure and the air-vent are necessarily susceptible to modification without departing from the spirit or scope of the invention; but a practical and preferred construction and arrangement of parts is shown in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a fountain-pen constructed in accordance with the present invention. Fig. 2 is an enlarged sectional view of the pen-bearing section of the pen and the elements of the feeder associated therewith. Fig. 3 is an enlarged sectional view of the feeder disassociated from all other parts. Fig. 4 is a perspective view of one form of the feeder—namely, the one illustrated in Figs. 1, 2, and 3. Fig. 5 is a detail in perspective of a modification of the feeder, disclosing a modified form of ink-flowing fissure piercing the attractive or capillary surface of the feeding-foot. Fig. 6 is a perspective view of the feeder, showing another modification of the ink-flowing fissure piercing the attractive or capillary surface. Figs. 7 and 8 are details in perspective, illustrating different forms of supplementary feeding-shafts arranged for use within the main conduit or duct of the feeder.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

In carrying out the present invention different forms of reservoirs or holders may be employed as well as different expedients utilized for holding in place the pen-point and feeder elements associated therewith, so long as the construction preserves the novel relation and arrangement of feeding elements forming the basis of the present application. However, for illustrative purposes a simple and practical construction is shown in the drawings, and referring particularly thereto the numeral 1 designates a tubular holder of the ordinary form, with which is associated the usual cap 2, designed for housing the pen and feeder parts when not in use and also adapted to be fitted to the closed or upper end of the holder during the use of the pen for writing purposes. The holder 1 by reason of its tubular or chambered formation provides an interior ink-reservoir 3 of the required capacity for holding in reserve a considerable supply of ink, and said holder is designed to carry at the lower or feeding-out end thereof a pen-bearing section or nozzle of some form, and this pen-bearing section or nozzle may be either an integral part of the holder or case 1 or a separate detach-

able element, as shown in the drawings. In the latter the numeral 4 designates the pen-bearing section or nozzle, which, as shown, consists of a short-length tube provided at one end with a threaded neck 5, detachably engaging the interiorly-threaded portion 6 at the lower end of the tubular holder or case 1. The said pen-bearing section 4 is interiorly counterbored, as at 6', for a greater portion of its length to provide an interior seat, within which is snugly received the inner or upper end of the feeder 7. Different expedients may be resorted to for assembling and holding together the feeder and the pen-bearing section or nozzle; but the construction described provides a practical and positive means for effecting this result.

In the practical embodiment of the invention the feeder 7 preferably has the body portion thereof in the form of a tube or tubular stem 8, having a longitudinal bore 9, extending practically the entire length and constituting the main ink conduit or duct, which is in direct and open communication with the reservoir 3 of the holder, and therefore is in effect a lower continuation of this reservoir. The said main conduit or duct 9 within the feeder tube or stem is illustrated as being flared upwardly toward the main reservoir in order to better insure a free flowing of the ink into and through the said conduit, although such a detail may be modified to suit the needs of the particular pen without affecting the principle of the invention.

Referring more particularly to the specific construction of the preferred form of feeder 7, the body or tubular stem 8 of the feeder is provided at its inner or upper end with an enlarged collar portion 10, which tightly fits within the counterbored seat 6' of the pen-bearing section against the shoulder 6<sup>a</sup> of such seat, and the said collar portion 10 of the tube or stem 8 is peripherally reduced to provide an annular seat 11 for the heel of the pen-point 12, thus providing means whereby the pen-point is held firmly within the pen-bearing section between the inner wall of the latter and the exterior surface of the collar portion of the feeder tube or stem. The feeder tube or stem 8 projects below its collar portion 10 out of the pen-bearing section and extends in approximately parallel relation to the pen-point 12. It is to be observed that by reason of the said enlarged collar portion of the feeder tube or stem the latter is held spaced away from the pen-point a material distance, thereby leaving an intervening clearance-space 13 far too wide to permit ink under any circumstances to gather therein or to be attracted or held in such space by capillary attraction. At its extreme lower closed end the tube-body or stem 8 of the feeder is provided with a feeding-foot 14, offset laterally from the said tube-body or stem in the direction of the pen-point 12 and located directly beneath and at the nibs of the pen-point, where the ink-supply is required.



The laterally-offset terminal feeding-foot 14 at the lower closed end of the tube-body or stem 8 is provided upon its outer side next to the pen-nibs with an expanded, yet necessarily restricted, attractive face 15, which is finished throughout its entire area to form the sole capillary surface of the feeder, and which capillary surface lies next to and contacts with the pen-nibs. The said capillary attractive surface 15 of the laterally-offset foot 14 is of a prolate form and extends well down toward the point of the pen, although the area of said capillary surface is restricted to the area of the pen-nibs, and within this area the feeder has its sole contact with the pen-point. Above said area the wide clearance-space 13 provides a non-attractive space, which therefore restricts the entire capillary feed for the drawing out of the supply of ink from the bottom of the ink-column entirely to the pen-nibs.

The prolate capillary attractive surface 15 on the outside of the feeder receives its supply of ink from a suitably-provided ink-flowing fissure 16. This ink-flowing fissure may be formed in any of the divers ways known to the skilful fountain-pen manufacturer, and the same may be in the form of a slot, such as shown in Figs. 3 and 4, which slot pierces the heel portion of the capillary surface 15 and communicates with the lower end of the main conduit or duct 9 through the feeder, or the said ink-flowing fissure may be in the form of a hole or small perforation 16<sup>a</sup>, such as shown in Fig. 5, or in the form of a transverse slit 16<sup>b</sup>, such as shown in Fig. 6, the same intersecting the surface 15 and also the lower end portion of the conduit or duct 9.

In the practical construction of the feeder the main conduit or duct 9 through the same is extended a slight distance below the ink-flowing fissure piercing the foot to provide at that point a closed auxiliary supply chamber or pocket 17, from which the ink will readily flow out through the fissure 16 and which is not affected to any appreciable extent by the influence of the column of ink above, which column of ink is suspended practically within its reservoir by atmospheric pressure.

Directly associated with the lower closed end portion of the conduit 9, which really forms the lower extension of the ink-reservoir, is the air-vent 18. The location of this air-vent with relation to the ink-flowing fissure and the other elements of the feeding means is a very important part of this invention. In order to attain the results herein indicated, this air-vent is located closely to the fissure 16, and it has been found by much experiment that the greatest advantage is obtained by locating the exit for the ink and the vent for air in close relation, and most particularly upon a feeder of such construction as will admit of carrying the ink-supply or the bottom of the real column of ink as far down upon the pen as possible before exerting any attraction upon it to withdraw the

same for use at the pen-point. It will thus be seen that the association of the elements described provides a limited or restricted attraction to induce sufficient ink to part from the bottom of the column of ink and at the same time provides a nearby air-admission vent of proper size, the whole being arranged so as to tap, as nearly as possible, the bottom of the ink-column, which is in reality well down upon the point of the pen. By said construction a most satisfactory flow of ink will be provided, and inasmuch as it flows from the limited capillary walls between the pen-point and the feeding-foot it cannot load and blot. The air-vent is located so close to the intake of the ink-flowing fissure and at the same time so well away from the contacting capillary surfaces that the nicest and most sensitive balance is preserved between the ink supply and demand at approximately one point. In short, the air-vent, while guarded by the wide clearance-space 13 contiguous to the shoulder produced by the offset 14, at the same time is disposed in close relation to the intake of the fissure and more remotely removed from the capillary surface supplied by said fissure. It is therefore apparent that the ink cannot by any possibility be attracted or held far beyond the limits of the capillary surface of the foot owing to the wide clearance-space provided for the purpose and within which the air-vent is located. The ink is drawn down within the feeder and always fills the ink-flowing fissure 16, and inasmuch as the air has free access at a separate clear space on the feeder, where it can never be affected, filled, closed, or covered over by an overabundant supply or load of ink, the sensitiveness of the flow of ink to the paper cannot be affected.

The air-vent relieves to the greatest desirable extent for the purposes specified the ink below the same from the attractive influence of the atmospherically-suspended column of ink above the vent. The attractive influence of this column is felt very little below the air-vent, yet at the same time there is enough attractive force provided within the lower end of the feeder to draw sufficient ink downward below the vent and out through the fissure to the nibs, where it is retained in the right quantity by the proper attraction provided by the capillary surface of the feeding-foot. The globules of air readily enter and ascend within the main ink-reservoir immediately as the ink-space below the vent is drawn open, and the space below the vent—the fissure—and the capillary attractive surface of the foot beneath the nibs are constantly supplied with the proper amount of ink ready for writing without an excess of attractive force, which would cause blotting.

To effect the more ready attraction or drawing of ink down within the feeder, there may be employed a supplemental feeder 19. This supplemental feeder 19 preferably consists of a flat feeding shaft or tongue arranged len-



gitudinally within the main conduit or duct 9 and extending into the bottom terminal auxiliary supply chamber or pocket 16 and also into the main reservoir or holder. The flat supplemental feeding shaft or tongue 19 may be wedged in the conduit or duct 9, and in the form illustrated in Figs. 2 and 6 may be provided with an intermediate cut-away portion 20, so that air-globules may enter the air-vent more readily and find easy passage upward in the conduit or duct. Other forms of supplemental feeding shafts or tongues may be employed—such, for instance, as shown in Fig. 8, this form consisting of a plain tapering shaft or tongue without an intermediate cut-away portion; but whatever form of supplemental feeder may be employed the same obviates the possibility of the ink remaining suspended within the conduit or duct 9 and refusing to flow.

From the foregoing it is thought that the construction and many advantages of the herein-described invention will be readily apparent to those skilled in the art without further description, and it will be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a fountain-pen, the holder carrying the pen-point, and a tubular feeder having at its lower closed end an offset feeding-foot provided with an expanded capillary attractive surface in contact with the nib portion of the pen-point and constituting the sole external capillary area of the feeder, and also provided with an ink-flowing fissure piercing said surface and communicating with the interior passage through the feeder, the latter being spaced from the pen-point to provide a non-attractive space above said capillary surface and provided within the zone of said space with an air-vent disposed in close relation to the intake of the fissure and more remotely removed from the capillary surface supplied thereby, the passage-way in the feeder being open and entirely unobstructed between the vent and said fissure.

2. In a fountain-pen, the holder carrying the pen-point and a tubular feeder having at its lower closed end a laterally-offset feeding-foot provided with an expanded prolate capillary attractive surface in contact with the

nibs and constituting the sole external capillary area of the feeder, and also provided with an ink-flowing fissure piercing said surface and communicating with the interior passage-way of the feeder, the latter being spaced from the pen-point to provide a non-attractive space above said capillary surface and provided within the zone of said space with an air-vent disposed in close relation to the intake of the fissure and more remotely removed from the capillary surface supplied thereby, the passage-way in the feeder being open and entirely unobstructed between the vent and said fissure.

3. In a fountain-pen, the holder carrying the pen-point, a tubular feeder provided with a lower closed end having a laterally-offset feeding-foot formed with an expanded capillary surface in contact with the nibs and pierced by an ink-flowing fissure located a distance above the lower end of the passage-way through the tube to provide at such end an auxiliary supply chamber or pocket, said feeder-tube being further provided with an air-vent disposed in close relation to the intake of the fissure and having the passage-way in the tube entirely open and unobstructed between the vent and said fissure, and supplementary means for positively feeding ink from the main column into the auxiliary supply chamber or pocket.

4. In a fountain-pen, the holder carrying the pen-point, a tubular feeder provided with a lower closed end having a laterally-offset feeding-foot formed with an expanded capillary surface in contact with the nibs and pierced by an ink-flowing fissure located a distance above the lower end of the passage-way through the tube to provide at such end an auxiliary supply chamber or pocket, said feeder-tube being further provided with an air-vent disposed in close relation to the intake of the fissure and having the passage-way in the tube entirely open and unobstructed between the vent and said fissure, and a supplementary feeding-shaft disposed longitudinally within the passage-way of the tube and extending the full length thereof, the lower extremity of said shaft projecting into the auxiliary supply chamber or pocket.

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

PAUL E. WIRT.

Witnesses:

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R. L. ORANGE.