(No Model.)

W. W. STEWART.

FOUNTAIN PEN.

No. 588,709. Patented Aug. 24, 1897.

Fig. 1.

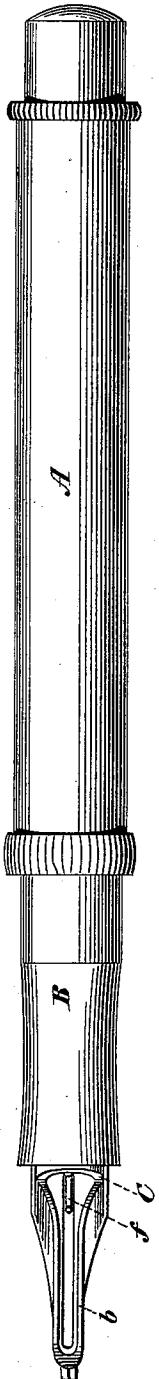


Fig. 2.

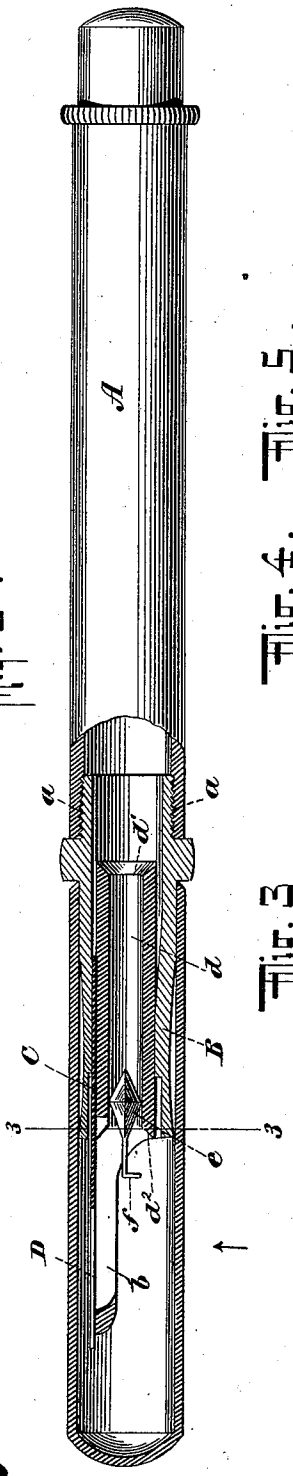
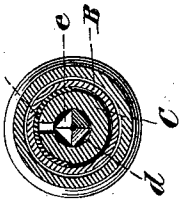


Fig. 5.

Fig. 4.

Fig. 3.



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FOUNTAIN-PEN.

SPECIFICATION forming part of Letters Patent No. 588,709, dated August 24, 1897.

Application filed February 18, 1897. Serial No. 624,010. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. STEWART, a resident of Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a full, clear, and exact description.

My invention relates more particularly to fountain-pens in which a tubular handle or reservoir closed at the upper end is used and wherein suitable ducts are provided at the lower end of the pen to convey ink to the pen-nib and to admit air to the reservoir. In fountain-pens of this description wherein air and ink are combined, so to speak, at the lower end of the pen, so that air is admitted to the reservoir and ink is allowed to be fed to the pen-nib, the air naturally forms itself into bubbles or globules on its passage to the reservoir. These globules naturally conform in size to the conduit or channel through which they have to pass, in view of which it will be obvious that the globules in themselves form means for obstructing the flow of ink through the conduit in which they are contained. Principally for this reason great difficulty has been experienced heretofore in providing a fountain-pen which will meet all requirements.

The object of my invention is to overcome these and other difficulties heretofore experienced and to provide simple and efficient means for controlling and regulating the flow of ink and for providing against the liability of the pen "sweating" when not in use, as will be hereinafter more fully explained.

To this end my invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference-characters indicate corresponding parts in various views, Figure 1 is a side view, looking in the direction of the arrow, Fig. 2, of a pen embodying my invention. Fig. 2 is a side view of the same, partly in section and taken at right angles to the representation in Fig. 1. Fig. 3 is a transverse sectional view on the line 3 3, Fig. 2. Figs. 4 and 5 are side and end views, respectively, of a modified form of obstruction-plug to be hereinafter more fully described.

The holder or reservoir A is preferably closed at its upper end and is adapted to connect with a nozzle B by screw-threads *a* or otherwise. Within the nozzle B may be maintained a feeder-bar C, which in the present instance is shown as comprising a body portion which preferably fits friction-tight in the nozzle B and is adjustable therein. From this body portion of the feeder-bar projects a slitted feeder-finger *b*, which in the present instance bears upon the under side of the pen-nib D, as shown in Fig. 2. The feeder-bar is provided with a bore or ink-conduit *d*, which is circular in cross-section and preferably terminates in flaring mouths d' d^2 to better control the bubbles and thereby control the flow of ink through the bore or conduit *d*. Within the circular bore *d* is contained an obstruction-plug *e*, which is independent of the feeder-bar and which is non-circular in cross-section at a portion of its diameter and terminates at its upper end within the conduit *d*. This plug is contained within the conduit at or near the lower end thereof and is preferably provided with an extension or finger-piece *f*, by which it may be adjusted in the conduit *d* or withdrawn therefrom. This plug is of sufficient diameter at portions thereof to make contact with the walls of the bore or conduit, so as to establish a nucleus for the flow of ink.

Having described the construction of the fountain-pen embodying my invention, I will now proceed to describe the operation thereof.

The pen may be readily filled by withdrawing the obstruction-plug *e* from the bore by means of the finger-piece or hook-like extension *f*, and when the pen is filled the obstruction-plug is replaced in the bore and the pen is in condition for use. In operation the ink and air pass in opposite directions through the apertures formed between the corners of the obstruction-plug and the walls of the circular bore. The ink is fed to the slit in the finger *b* of the feeder-bar and thence to the pen as required. The air passing to the rear of the obstruction-plug *e* has a tendency to form into a globule of about the same diameter as the obstruction-plug. It will be readily understood that if the obstruction-plug *e* were circular instead of non-circular in cross-section and of smaller diameter than the conduit an air-bubble at the rear of the obstruc-

tion would form a seal against the flow of ink and air in opposite directions and a control of the flow could not be had. Various means have been devised heretofore to either destroy or otherwise get rid of these bubbles, but by my invention I am enabled to utilize them to automatically control the flow of ink to the pen-nib. The obstruction *e* maintains a bubble near the lower end of the conduit, and under ordinary circumstances would tend to choke the flow of ink and air in opposite directions, but the fact that the plug is non-circular in cross-section, preferably where it contacts with the walls of the conduit, allows of the ready flow of ink and air in opposite directions. In other words, the tendency of the bubble at the rear of the obstruction-plug *e* is to form a globule or semiglobular film, and a space is formed between said film and the angular or non-circular obstruction-plug which forms a nucleus for the influx and efflux of air to and from the reservoir, and the portions of said obstruction-plug which contact with the walls of the conduit constitute a nucleus for the flow of ink to the pen-nib.

It will be observed that by my invention the obstruction-plug forms a controlling means for the flow of ink and air which is entirely independent of the feed to the pen-nib from the feeder-finger of the feeder-bar, and that a pen of my construction can properly ventilate itself at all times, and thereby prevent all liability of sweating—that is to say, when the pen is not in use there is no liability of the expansion of the air within the holder causing air-bubbles with the ink which forms a component part thereof being forced out through the bore and around the pen-nozzle, as heretofore, because the air within the holder at all times may escape through the apertures formed between the surface of the bubbles and the obstruction-plug *e*. Thus, assuming that a bubble has a tendency to rise in the conduit *d* when the pen is not in use, it will travel as far as the obstruction-plug and there be retained, at the same time allowing the air to escape between the obstruction-plug and the film.

My invention is of particular value in large pens wherein a considerable flow of ink is required because of the absolute control and regularity of the flow without liability of the pen sweating, "bleeding," or dropping ink, which heretofore could not be had. Furthermore, it will be seen that the single conduit of my construction forms practically an extension of the reservoir and constitutes in itself a reservoir of some considerable proportions, which may be readily drawn upon for a supply of ink to the pen-nib. It will likewise be observed that by my invention I am enabled to provide an efficient pen which is simple in construction and wherein there is little liability of the parts getting out of order and wherein there are no minute channels or passages which are liable to become choked and render the pen inoperative.

I am aware that heretofore feeder-bars of non-circular shape in cross-section, contained within conduits of circular shape in cross-section, have been devised, and such constructions I do not claim, the "obstruction-plug" of my invention being essentially different in function and effect from these feeder-bars.

What I claim, and desire to secure by Letters Patent, is—

1. In a fountain-pen, the combination of an ink-conduit in communication with the pen-nib and with the open air, and a non-circular obstruction-plug contained within said conduit at or near the lower end thereof and terminating therein.

2. In a fountain-pen, the combination of an ink-conduit circular in cross-section, the said conduit being in communication with the pen-nib and with the open air and a non-circular adjustable obstruction-plug contained within said conduit at or near the lower end thereof and terminating therein.

3. In a fountain-pen, the combination of an ink-conduit circular in cross-section, said conduit being in communication with the pen-nib and with the open air and a non-circular adjustable and removable obstruction-plug contained within said conduit at or near the lower end thereof and terminating therein.

4. In a fountain-pen, the combination of an ink-conduit circular in cross-section, said conduit being in communication with the pen-nib and with the open air and a non-circular obstruction-plug contacting with the walls of said conduit at or near the lower end thereof and terminating therein.

5. In a fountain-pen, a feeder-bar having a slitted feeder-finger projecting therefrom and an ink-conduit circular in cross-section, the said conduit being entirely surrounded by the walls of said feeder-bar and in communication with the reservoir and with the open air and a non-circular obstruction-plug independent of said feeder-bar contained within said conduit at or near the lower end and terminating therein.

WILLIAM W. STEWART.

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