

UNITED STATES PATENT OFFICE.

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FOUNTAIN-PEN.

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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 specification.

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 letters represent corresponding parts in the various views, Figure 1 is a side view, looking in the direction of the arrow *x* in Fig. 2, of a pen embodying my invention, the cap having been removed. Fig. 2 is a central longitudinal sectional view on the line 2 2 of Fig. 5 with the cap in place. Fig. 3 is a detail top view of the feeder-bar. Fig. 4 is a detail longitudinal sectional view of the nozzle. Fig. 5 is a transverse sectional view of the pen on the line 5 5 of Fig. 2. Fig. 6 is a detail side view of the controlling obstruction and its connection. Fig. 7 is a detail longi-

tudinal sectional view of a sufficient number of parts of a fountain-pen to illustrate a modified form of my invention. Fig. 8 is a detail top view of a pen-nib which is preferably used in the construction illustrated in Fig. 7.

The holder or reservoir A is preferably closed at its upper end and is adapted to connect with the 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 and is adjustable in the nozzle B. From this body portion of the feeder-bar projects a slitted feeder-finger *b*, that bears upon the under side of the pen-nib D, as shown in Fig. 2. The slit in the finger of the feeder-bar is in communication with recesses *c c'*. The feeder-bar is provided with a non-circular or angular bore or ink-conduit *d*, (see Fig. 5,) which preferably terminates in the flaring mouths *d' d''* to better control the bubbles, and thereby control the flow of ink through the bore or conduit *d*, as will be hereinafter more fully explained.

It will be observed that the recess *c* extends on but one side of the slitted finger of the feeder-bar and that the other side is plane. By this means I am enabled to hold to one side out of the path of the main slit in the feeder-finger any bubbles which may pass along said slit and which if allowed to remain therein would choke the same and prevent the free flow of ink to the pen-nib. Within the angular bore *d* is contained the globular mechanical obstructing-piece, which preferably consists of a rubber ball *e*, having a diameter sufficient to make contact with the walls of the bore or conduit, so as to establish a nucleus for the flow of ink. This ball *e* may be mounted upon a wire or support *f*, that projects within the handle or reservoir and is provided with means for preventing the withdrawal of the obstructing ball or piece entirely from the pen. In the present instance this means consists of forming the end of the wire *f* into a hook *g* after the same has been passed through a sleeve *h*, carried upon a plug *i*, adapted to be secured in the upper end of the holder. The wire *f* may pass through the ball *e* to form a hook-like shank *j* at the lower end, by which the

user of the pen is enabled to adjust the ball within the bore. It will be observed that by this means the mechanical obstruction or ball may be adjusted within the bore or may
5 be entirely removed therefrom for the purpose of filling the pen without removing the nozzle.

In small pens it may be found desirable to construct the pen as shown in Fig. 7, where-
10 in the feeder-bar C is dispensed with and the heel *k* of the pen D is entered into the angular bore *d* of the nozzle B, so as to divide said bore, the wire *i* with ball *m* thereon acting to control the flow of ink to the pen.

15 Having described the construction of two forms of fountain-pen embodying my invention, I will now proceed to describe the operation thereof. The pen illustrated in Figs. 1 to 6 may readily be filled by withdrawing
20 the ball *e* from the bore by means of the hook-like extension *j* sufficiently far to expose the mouth of said bore. The ball is then replaced in the bore, when the pen is in condition for use. In operation ink and air pass
25 in opposite directions through the apertures formed between the corners of the angular bore and ball *e* and the lower end of the pen. The ink passes to the recess *c'*, from which it is fed to the pen-nib as required. The air
30 passing to the rear of the ball or obstruction *e* forms into globules or bubbles, each of which is of about the same diameter as the ball *e*, and passes up the ink conduit or bore to the reservoir. It will be readily understood that
35 if the bore *d* were circular instead of angular each of the air-bubbles would fill the bore and no control of the flow could be had. Various means have been devised heretofore to either destroy or otherwise get rid of these
40 bubbles, but by my invention I am enabled to utilize them to automatically control the flow of ink to the pen-nib. The ball *e* is a mechanical obstruction which performs the same function as one of nature's bubbles retained
45 against movement. It is in a sense a bubble which may be maintained at the lower end of the bore and is at all times under control of the user, so that it may be adjusted in the bore to give a greater or less flow of ink
50 to the pen.

The enlargements *d'* *d*² in the feeder-bar C and in the nozzle shown in Fig. 7 are in the nature of valve-seats and act at times with the bubbles to restrain the flow of ink. For
55 instance, a film or bubble having been invoked within the reservoir behind the enlargement *d*² will be prevented from being forced through the bore *d* by the weight of the ink behind the bubble, but will be retained
60 against the enlargement as against a valve-seat and prevent the too-ready flow of ink through the bore.

It will be observed that the pen can properly ventilate itself at all times and thereby
65 prevent all liability of sweating—that is to say, when the pen is not in use there is no

liability of the expansion of 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
70 within the holder at all times may escape through the apertures formed between the surface of the bubbles (and of the obstruction *e*) and the corners of the bore. 75

My invention is of particular value in large pens where 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,
80 which heretofore could not be had.

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

1. In a fountain-pen, the combination of
85 angular ink-conduit in communication with the pen and with the open air, and a mechanical obstruction contained in the path of said conduit and leaving unobstructed openings at the corners thereof. 90

2. In a fountain-pen, the combination of an angular ink-conduit in communication with the pen and with the open air, and an adjustable obstruction contained in the path
95 of said conduit and leaving unobstructed openings at the corners thereof. 95

3. In a fountain-pen, the combination of an angular ink-conduit in communication with the pen and with the open air, and an adjustable and removable obstruction con-
100 tained in the path of said conduit and leaving unobstructed openings at the corners thereof. 100

4. In a fountain-pen, the combination of an angular ink-conduit in communication
105 with the pen and with the open air, and a ball contacting with the walls of said conduit and adjustable therein. 105

5. In a fountain-pen, a feeder-bar having an angular bore extending therethrough, said
110 bore being entirely surrounded by the walls of said feeder-bar and in open communication with the reservoir and with the air, a feeder-finger extending from said feeder-bar and contacting with the pen-nib to convey
115 ink thereto from said angular bore and means for controlling the flow of ink to said bore. 115

6. In a fountain-pen, a feeder-bar having a slitted feeder-finger for conveying ink to the pen-nib and a recess formed on one side
120 only of the feeder-finger, said recess being in communication with the slit in the feeder-bar. 120

7. In a fountain-pen, the combination of a non-circular ink-conduit in communication with the pen-nib and with the open air and
125 a globular mechanical obstruction contained within said conduit. 125

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Witnesses:

DAN MATTHEWS,
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