

(No Model.)

E. B. NIMMO.  
STYLOGRAPHIC PEN.

No. 284,569.

Patented Sept. 4, 1883.

Fig. 1.

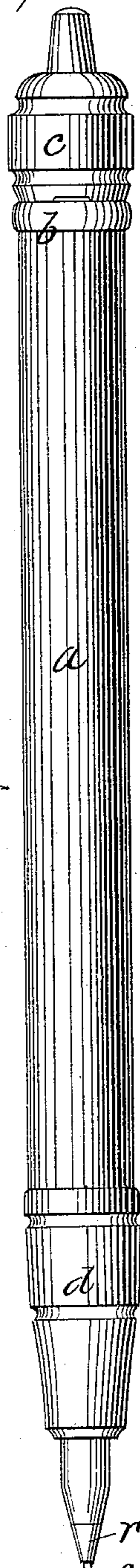


Fig. 2.

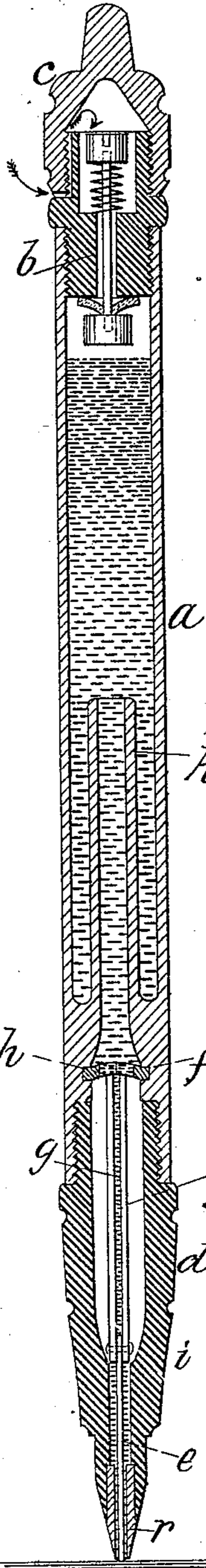


Fig. 4.

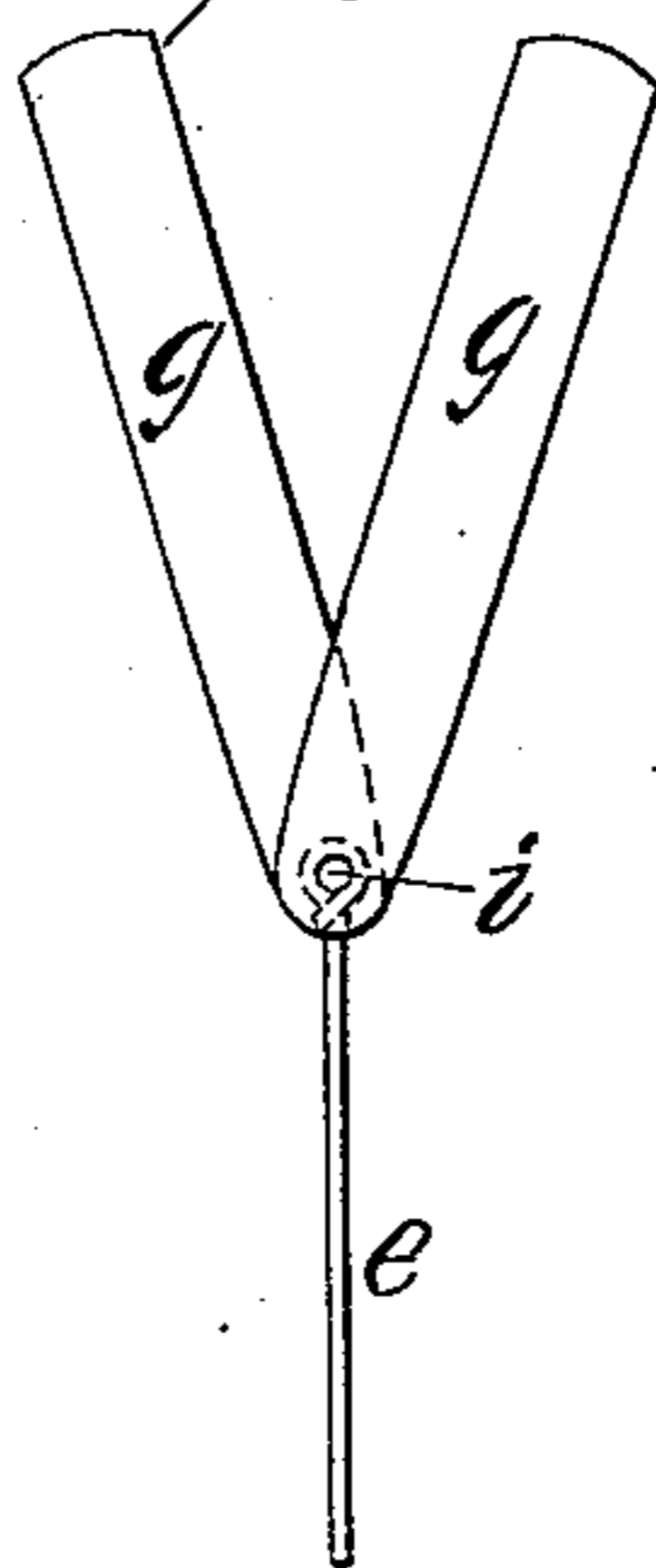


Fig. 3.

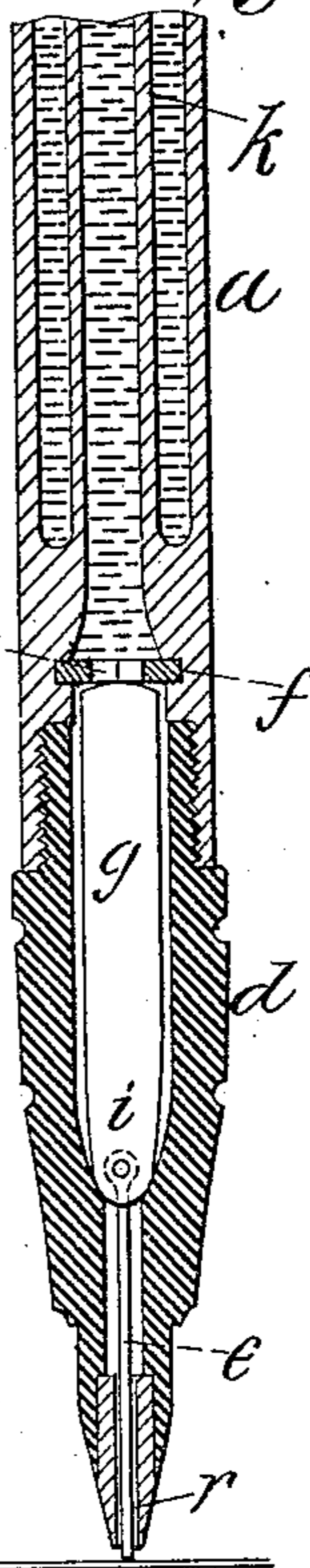


Fig. 5.

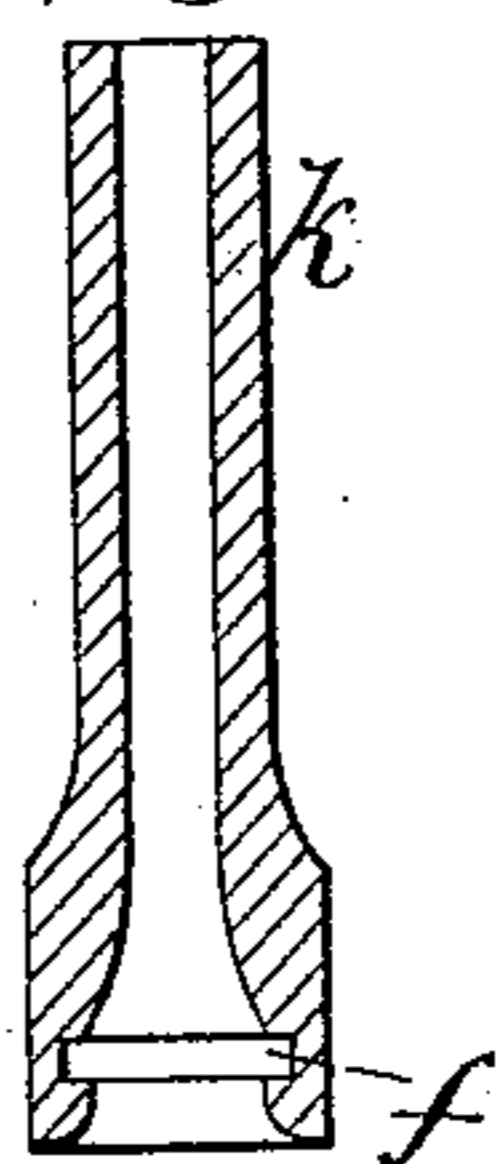


Fig. 6.



Witnesses: e  
Henry F. Parker.  
Geo. C. Gavin

Inventor:

Edward B. Nimmo  
by Chas. M. Higgins  
Atty

# UNITED STATES PATENT OFFICE.

EDWARD B. NIMMO, OF BROOKLYN, NEW YORK.

## STYLOGRAPHIC PEN.

SPECIFICATION forming part of Letters Patent No. 284,569, dated September 4, 1883.

Application filed October 9, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD B. NIMMO, of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Stylographic Pens, of which the following is a specification.

My improvement aims to furnish a stylographic or fountain pen of simple and inexpensive construction with an effective action, more particularly in insuring an even and regular flow of the ink when writing, yet reducing the "bleeding" action to a minimum.

To these ends my invention embodies several novel features, which lie chiefly in the construction of the ink-reservoir and its outlets, and in the vibrating needle-holder or ink-conductor which operates in relation with the reservoir, whose objects are to insure the retention of the ink when the pen is quiescent, yet render its flow certain and regular when the pen is in action, as hereinafter fully set forth.

In the annexed drawings, Figure 1 presents an external elevation of my improved pen. Fig. 2 is a sectional elevation thereof, showing its interior. Fig. 3 is a fragmentary sectional elevation of the lower part, taken at right angles to Fig. 2. Fig. 4 is a view of the needle and its holder removed. Fig. 5 represents a modification of the outlet end of the ink-reservoir. Fig. 6 represents a plan of the outlet-valve of the ink-reservoir.

In the drawings, *a* indicates the case or handle of the pen, which is, as usual, a tube, and forms the ink-reservoir. In the upper end of this tube is screwed the hollow plug *b*, which carries an inwardly-opening valve, which forms the air-vent valve, and is held lightly to its seat by a delicate spring, but will yield slightly to allow a slow infiltration of air when the vent-cap *c* is screwed up, as will be understood. This vent-valve, &c., is of ordinary construction, which is well shown in the drawings, and therefore needs no special description here. The lower end of the reservoir-tube *a* is threaded internally to receive the threaded neck on the point-section *d*, which screws tightly therein, as usual. In the pointed end of the section *d* is fixed the usual capillary tube, forming the writing-tip of the pen, in which the needle or style *e* works, as is common in stylographic pens.

Now, near the bore or outlet end of the res-

ervoir, and just above the socket in which the point-section is screwed, a groove, *f*, is formed around the bore of the reservoir, in which a disk, *h*, of pure vulcanized elastic rubber or other suitable flexible or elastic material, is socketed, as fully shown in Figs. 2 and 3. This disk is shown detached in plan in Fig. 6, and is slit or perforated with one or more slits or cuts, preferably at right angles to each other, in cross shape, as shown, which slits are also indicated in Figs. 2 and 3. This disk thus covers the mouth or outlet of the reservoir, and when at rest the slit or cut sections close together, so as to positively retain the ink and prevent its outflow from the reservoir. If, however, the disk be agitated or moved up and down slightly at the middle, the slits or cut sections will be slightly opened and closed and so articulated as to produce a gentle, regular, and positive outfeed of the ink. This ink-feeding movement of the disk is effected directly by the natural and usual vibration of the needle *e* in the act of writing, for the upper and inner end of the needle is connected with the needle-holder *g*, which is inclosed in the point-section *d*, and reaches to the slit disk *h* and bears upon or contacts therewith, as fully shown in Figs. 2 and 3. As usual, the point of the needle *e* protrudes slightly from the writing-point of the pen when at rest, as seen in Fig. 3, and in this position of the needle the needle-holder *g* will seat at its lower end on the tapering end of the bore or cavity in the point-section which incloses it, which thus forms a stop to prevent the further projection of the needle, and the further down motion of its holder. The holder, however, is of such a length that when in this position its upper end will just contact with the disk *h*, when said disk is in its quiescent and flat position, as seen in Fig. 3. It is therefore obvious that when the needle is forced inward by the pressure of writing, the needle-holder will be forced against the disk *h*, so as to distend or bulge the disk slightly upward or inward in the reservoir, as shown in Fig. 2, while when the pressure on the needle-point is relaxed the elastic reaction of the disk will move the needle-holder back to its stop and project the point of the needle from the tip of the pen, as seen in Fig. 3. Hence the vibrations of the needle agitate the disk, and vice versa, thus

producing a gentle and positive outfeed of the ink, proportioned to the movements of the needle, while at the same time the elastic disk serves as a spring to keep the needle projected, 5 assisted by the weight of the holder *g*, thus dispensing with the necessity for a special spring, as heretofore used, and thereby rendering the construction very simple and efficient. The needle-holder *g* may therefore be 10 termed the "agitator," as it agitates the disk and induces the outfeed of the ink, and it may also be termed the "ink-conductor," as it conducts the ink by capillary attraction direct from the disk to the needle, or to the capillary 15 tube *n*, in which the needle works. The agitator is, hence, made of two thin overlying plates, *g g*, loosely riveted to the needle at the lower end, thus leaving a narrow capillary space between the plates, through which the 20 ink is evenly conducted from the disk to the needle, as best shown in Fig. 2.

The needle *e* is preferable made of a fine stiff wire, of any suitable metal, bent with an eye at its upper end, and held between the 25 lower ends of the agitator-plates *g g* by a rivet, *i*. The plates *g* are thus riveted together and to the needle at one end only, which thus forms a pivot on which the plates may be swung apart or diverged, as seen in Fig. 4, 30 which will thus allow the plates to be easily cleaned of any incrustations of ink or other matter. The riveted joint, furthermore, is somewhat free or loose, so that in the vibration of the needle and agitator the plates are 35 permitted a slight longitudinal shearing movement on each other, which conduces to a perfect feed of the ink down the capillary channel between them, and prevents the ink from becoming clogged therein, as will be readily 40 appreciated.

Instead of having the base of the ink-reservoir opening directly over the disk *h*, I prefer to provide the reservoir with a damming tube or partition, *k*, rising from the bottom of 45 the reservoir up within the same to about the middle thereof, as shown in Fig. 2, the interior or bore of the tube forming the outlet-channel to the disk *h*, while the space around the tube forms a pocket in which a quantity 50 of ink will always be dammed or imprisoned. This feature of construction I find to greatly reduce the tendency to "bleed," which exists to a greater or less extent in all pens of this class, caused by the expansion of the contained air 55 and ink, due to the heat of the hand when first commencing to write. The contracted passage of the tube *k* and the larger capillary surfaces which it presents to the ink seem to appreciably retard its outflow, so that bleeding is greatly 60 resisted and reduced. By this means, also, but a small quantity of the ink in the reservoir rests on the diaphragm *h*, particularly when the ink has been used down to the tube *k*, and after this point the ink held in the pocket 65 around the tube may be readily thrown over into the outlet-channel by giving the pen an

occasional shake during writing, thus keeping up a supply of ink to the disk *h* without having the entire quantity sustained on the disk.

By referring to Figs. 2, 3, and 4 it will be 70 noted that the agitator *g g* is formed of two thin flat blades, preferably of hard rubber, of about the same width as the diameter of the round cavity or bore in the point-section which incloses them, so that the agitator is a nice 75 working fit in the position of a diametrical plane in the cavity, but does not entirely fill the cavity, leaving a free space on each side of the agitator, as seen in Fig. 2. This feature also reduces bleeding, as the free space on 80 each side of the agitator allows the small quantity of ink which may "bleed" from the disk *h* to rise in this space, and thus prevents it from immediately running off or bleeding from the tip before it could be used in the act 85 of writing, as will be readily understood.

In Fig. 2 I have shown the tube *k* and socket for the disk *n* formed solid or integral with the case or reservoir-tube *a*; but these parts may be made separate from the tube *a*, as indicated in Fig. 5, and then tightly inserted in 90 the reservoir-tube, as will be understood.

The entire construction of the pen, as may now be seen, is simple and inexpensive, and its action direct, positive, and reliable, and 95 the invention forms, it is believed, a material improvement in pens of this class.

What I claim is—

1. A fountain or stylographic pen constructed with a flexible and slit or perforated disk 100 or diaphragm covering the outlet of its ink-reservoir, with an agitator arranged to vibrate against the said slit disk by the vibratory movement of the needle or writing movement of the pen, substantially as and for the 105 purpose herein set forth.

2. In a stylographic pen, an elastic slit disk covering the outlet of the ink-reservoir, in combination with an agitator connected with the vibrating needle, bearing at one end against 110 the said elastic disk, and resting at the opposite end on a seat or stop in the pen point or case, whereby the inward movement of the needle and connected agitator distends or stretches said disk, while the elastic reaction of 115 the disk throws out the agitator and its attached needle, thereby maintaining the vibratory motion of the needle and inducing the outfeed of the ink at the same time, substantially as herein shown and described. 120

3. In a stylographic pen, an agitator and ink-conveyer connected at one end with the needle and bearing at the opposite end on the outlet of the ink-reservoir, and formed in two 125 overlying plates or sections, forming a capillary ink-channel between them from the outlet of the reservoir to the needle, or to the capillary tube in which the needle works, substantially as herein set forth.

4. The combination, in a stylographic pen, 130 with the vibrating needle, the ink-reservoir, and a suitable vent thereto, of an elastic slit

disk or partition covering the internal outlet of the ink-reservoir, an agitator connected with the vibrating needle and bearing on said disk, and formed in two overlying plates, with a capillary ink-channel between them, substantially as herein shown and described.

5 5. The needle-holder and ink-conductor *g g*, formed of two overlying plates or blades pivoted to each other at one end at their connection with the needle, and capable of being opened or diverged apart or closed together, substantially as and for the purpose set forth.

15 6. In a stylographic pen, an ink-reservoir formed with an intermediate damming tube or partition rising from the ink-outlet at the base of the reservoir up within the same to or near the middle thereof, forming a dammed ink space or pocket around or on one side of said partition or tube, from which the ink can be shaken into the outlet-channel as desired, substantially as and for the purpose set forth.

25 7. A stylographic pen constructed to embody the following elements: an ink-reservoir formed with a suitable air-vent at one end and an internal outlet at the other end, an elastic slit disk covering said outlet, an agita-

tor bearing below said disk and connected with the needle in the point-section of the case, and a bore or cavity around said agitator in the point-section, of larger volume than the agitator, providing a free space about the same, substantially as and for the purpose set forth.

8. In a stylographic pen, the combination, with the ink-reservoir, formed with a socket-groove around its base or outlet, of an elastic slit disk, *h*, secured therein, and a vibrating needle operating in relation therewith in the point-section of the pen, substantially as and for the purpose set forth.

9. In a stylographic pen, an ink agitator and conveyer connected with the needle, formed of two overlying plates, providing a capillary ink-channel between them, and freely jointed to permit of a longitudinal shearing movement of the plates upon each other under the vibrations of the needle, substantially as herein set forth.

EDW. B. NIMMO.

Witnesses:

CHAS. M. HIGGINS,  
JNO. E. GAVIN.