

UNITED STATES PATENT OFFICE.

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STYLOGRAPHIC PEN.

SPECIFICATION forming part of Letters Patent No. 769,427, dated September 6, 1904.

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To all whom it may concern:

Be it known that I, DAVID W. BEAUMEL, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Stylographic Pens, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to stylographic pens in which ink is constantly supplied to the writing-point, which is constituted by a perforated nozzle, through which projects the end of a stylus or needle.

My present improvements have particular reference to the type of stylographic pen in which the stylus or needle instead of being stationary is loosely mounted, so as to reciprocate upon its length during the writing movements. The invention seeks to render this form of pen more certain in its writing action by feeding the ink to the writing-point uniformly and regularly; to simplify the construction of the mounting of the reciprocating needle and its valve, so as to render the needle and its attached parts readily accessible when the nozzle is removed to permit the same to be grasped and reciprocated for the purpose of cleaning the passage through which the ink flows around the needle, and also to simplify the construction, so that the parts which are mounted in the nozzle for carrying the needle may be readily assembled or taken apart, as the case may be.

With these and other objects in view my invention consists in the various novel and peculiar arrangements and combinations of the several parts of the device, all as hereinafter fully described, and then pointed out in the claims.

I have illustrated types of my invention in the accompanying drawings, wherein—

Figure 1 is a longitudinal sectional view taken through the center of a stylographic pen embodying my improvements with the protecting-cap of the pen shown as mounted upon the butt-end of the holder and partly in section and broken away. Fig. 2 is a similar

view of a modified form of the invention. Fig. 3 is a detailed view of the removable friction-sleeve which is mounted within the inner end of the nozzle and, together with the nozzle, provides the necessary mounting for the needle and its weight and valve.

Referring to the drawings, in which like numbers of reference designate like parts throughout, 1 is a tubular holder, having the upper end thereof closed air-tight, with the lower end open and screw-threaded upon the interior thereof for receiving the inner screw-threaded end of the nozzle. Upon the butt-end of the holder is shown as removably mounted thereon the ordinary protecting-cap 2. The nozzle 3, having its inner end screw-threaded at 4 to fit liquid-tight within the lower end of the holder, is provided with a main ink-chamber 5, the lower end of which is contracted somewhat at 6, and from thence extends the ink-passage 7 to the outer end of the nozzle, within which outer end is fixed the usual metal sleeve 8.

The metallic stylus or needle 10 extends through the ink-passage 7, and its inner end is mounted in the lower end of a suitable rod 11, made, preferably, of hard rubber though any other well-known and light material may be used. Upon the upper end of the needle or stylus carrying rod 11 is mounted in fixed position a suitable metallic weight 12, which is sufficiently heavy to give to the rod and its needle a positive reciprocating movement when the pen is held in such position as to permit the needle to move endwise and during the writing action.

Within the inner smooth end of the nozzle 3 is removably mounted a friction sleeve or tube 13, the central passage 14 of which is considerably smaller than the main chamber 5 of the nozzle, and this sleeve has two diameters, the smaller one fitting within the nozzle and the larger one lying without the same, and the intermediate shoulder 15 takes against the inner end of the nozzle 3 when the sleeve is pushed down in its proper position. This sleeve carries the needle-supporting part 11, which is virtually the needle, in its axial position, and a stop or collar 20, fixed upon the rod 11 at a point between the outer end of the

sleeve 13 and the needle, serves to limit the inward movement of the rod, and accordingly the needle, and by means of this collar or stop 20 the needle and its adjuncts are prevented from dropping backwardly out of the nozzle when the nozzle is detached from the holder. The central passage 14 of the sleeve 13 is somewhat larger than the diameter of the cylindrical rod or stem 11, which passes there-through, and the annular space that is provided affords the passage for the ink from the reservoir to the nozzle in supplying the writing-point and likewise affords a passage for the ink to flow back from the nozzle into the reservoir when the pen is placed point uppermost. In order to facilitate the admission of ink from the reservoir 1 into the passage 14, I form the inner mouth of such passage funnel-shaped or upwardly flaring, as at 16, so that the ink which is directly introduced therein from the reservoir may flow readily down such passage, the stem 11 itself projecting into the reservoir and affording means for leading the ink down through the passage 14 of the sleeve 13. This direct flow of the ink downwardly from the reservoir through the sleeve 13 and around the stem and the projecting of the stem itself into the ink in the reservoir 1 are particular features of the present improvements and serve to facilitate the proper feeding of the ink from the reservoir down into the nozzle, thence to the stylus, as well as the quick return of the ink from the point below the sleeve 13 back into the reservoir when the pen is out of use and is placed with its point uppermost. In order to further facilitate the ready return of the ink from the point below the sleeve 13 back through the same and into the reservoir, I form the outer end of the sleeve 13 with a series of slits or notches 19, as clearly shown in Fig. 3 and also indicated in the other figures in dotted lines. These slits 19 assist the draining back of the ink from the chamber 5 in the nozzle in connection with the stem 14, which extends along by the slits and through the sleeve.

The necessary supply of air to the interior of the stylographic pen is afforded through a straight perforation or duct 18, which extends in inclined direction from a point within the flange or guard 17 on the exterior of the nozzle 3 downwardly and inwardly until it reaches the chamber 5 within the nozzle, into which it opens at a point somewhat above the lower end of the body 11, which has the double function of supporting the needle 10 and having its lower end acting as a valve on the seat 21, located at the lower end of the chamber 5 in the nozzle and at the mouth of the ink-passage 7, through which the needle extends. I find by having the straight air-passage 18 running obliquely into the ink-chamber 5 at a point below the lower end of the valve 11 that such air-passage performs all

the required functions of an air-passage in a stylographic pen without, however, causing the ink to be fed too rapidly to the writing-point or to be spurted therefrom by the action of the air on the ink. In this connection it will be noted that the valve which closes on the seat 21 in the lower end of the ink-chamber 5 is constituted by the lower end of the stem or rod 11, which is made of a suitable non-corrosive and light-weight material, such as hard rubber.

In the modification shown in Fig. 2 the stem or rod 11' of non-corrosive light-weight material is made considerably shorter and thicker than the stem 11 of the other form and the needle 10 is supported thereby, the lower end of the stem 11' constituting the valve, which seats itself on the seat 21 within the nozzle, and at the same time serving to connect with and carry the weight, which in this construction takes the shape of an elongated body 22. This elongated metallic part 22 extends through the sleeve 13 and serves as the leading-stem for the ink in passing in either direction through the same, as previously described in connection with the form shown in Fig. 1 and in reference to the stem 11 thereof, the part 22 extending also well up into the ink-reservoir, as indicated. In this form the air-passage 18 likewise opens at a point above the lower end of the valve 11' and performs its function as hereinabove described in connection with the other construction. The construction thus set forth provides a reciprocating support or carrier for the needle 10 and the range of movement of reciprocation being the distance indicated in Fig. 2 between the lower end of the sleeve 13 and the upper end of the stem 11', substantially the same range of movement as shown in connection with Fig. 1. This range of movement is such that the air-passage 18 is maintained at a point which can never be below the valve, or, in other words, the air-passage is so located that in the range of endwise movement of the needle carrier or support the stem 11 which connects the needle and the weight is constantly present over the point where the air is introduced. The air-passage 18 thus opening at a point opposite to which the side of the stem 11 or 11' is always located the air cannot be let in at a point below the valve-seat 21, and this prevents the ink from being spurted from the writing-point.

By virtue of having the sleeve 13 removably mounted in the inner end of the nozzle 3 by a simple friction-joint such sleeve may be readily removed when the nozzle is detached for the purpose of taking the needle and its valve out. This construction also provides a ready means for grasping the projecting end of the stem, which extends through the sleeve, for the purpose of reciprocating or agitating the same when the nozzle is detached and in the effort to clean the ink-pas-

sage 7, through which the needle extends, and the ink is thereby brought more directly in contact with the needle than if the stem did not project up through the sleeve 13 and into the reservoir.

The valve which coöperates with the seat 21, and thus controls the ink-passage 7 of the nozzle, practically closes such passage when the pen is held with its point downward, and in this way the ink is prevented from accidentally flowing from the pen. As soon, however, as the pen is pressed upon the paper in the writing movement the needle being pushed inwardly raises the valve slightly, and thus opens communication between the ink-passage 7 and the ink-chamber 5 in the nozzle.

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

1. A stylographic pen comprising the combination of an ink holder or reservoir provided with a detachable nozzle, the said nozzle having an ink-chamber and an ink-passage extending therefrom to the writing-point, an air-passage for supplying air to the interior of the pen, a removable sleeve mounted in the inner end of said nozzle, a stylus extending through the said ink-passage in the nozzle, and a reciprocating carrier for said stylus provided with a stem or rod extending loosely through said sleeve beyond the same with its free end projecting into the ink-reservoir, substantially as and for the purpose set forth.

2. A stylographic pen comprising the combination of an ink holder or reservoir provided with a detachable nozzle, the said nozzle having an ink-chamber and an ink-passage extending therefrom to the writing-point, an air-passage for supplying air to the interior of the pen, a removable sleeve mounted in the inner end of said nozzle, a reciprocating stem or body mounted in said ink-chamber and provided at its outer end with a stylus extending through said ink-passage in the nozzle, a valve-seat in the lower end of the ink-chamber at the mouth of the ink-passage, the lower end of said stem or body acting as a valve on said valve-seat, and a suitable weight attached to the inner end of said stem, substantially as and for the purpose set forth.

3. A stylographic pen comprising the combination of an ink holder or reservoir provided with a detachable nozzle, the said nozzle hav-

ing an ink-chamber and an ink-passage extending therefrom to the writing-point, an air-passage for supplying air to the interior of the pen, a removable sleeve mounted in the inner end of said nozzle, a stylus extending through the said ink-passage in the nozzle, and a reciprocating carrier for said stylus provided with a stem or rod extending loosely through said sleeve, the upper end of the interior of said sleeve being formed with an upwardly-flaring mouth, substantially as and for the purpose set forth.

4. A stylographic pen comprising the combination of an ink holder or reservoir provided with a detachable nozzle, the said nozzle having an ink-chamber and an ink-passage extending therefrom to the writing-point, an air-passage for supplying air to the interior of the pen, a removable sleeve mounted in the inner end of said nozzle, a stylus extending through the said ink-passage in the nozzle, and a reciprocating carrier for said stylus provided with a stem or rod extending loosely through said sleeve, the lower end of said sleeve being provided with notches or slits for the passage of the ink, substantially as and for the purpose set forth.

5. A stylographic pen comprising the combination of an ink holder or reservoir provided with a detachable nozzle, the said nozzle having an ink-chamber and an ink-passage extending therefrom to the writing-point, a removable sleeve mounted in the inner end of said nozzle, a reciprocating stem or body mounted in said ink-chamber and provided at its outer end with a stylus extending through said ink-passage in the nozzle, a valve-seat in the lower end of the ink-chamber at the mouth of the ink-passage, the lower end of said stem acting as a valve on said valve-seat, a suitable weight attached to the inner end of said stem, and an air-passage extending from the exterior into said ink-chamber and opening at a point therein opposite the side of said stem or body, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

DAVID W. BEAUMEL.

Witnesses:

WILLIS FOWLER,
WILLIAM H. STEIN.