

UNITED STATES PATENT OFFICE.

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RESERVOIR-PEN.

960,413.

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To all whom it may concern:

Be it known that I, WILLIAM W. SANFORD, a citizen of the United States, and a resident of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Reservoir-Pens, of which the following is a specification.

This invention relates to improvements in reservoir pens.

It is applicable as well to fountain pens as to stylographic pens, and is especially intended for pens of the kind generically known as self-filling or auto-pens.

It is the purpose of the invention to provide a self-filling pen without a collapsible sack, and without a special plunger, or any other such device, by adding to the reservoir and the cap, which are used in all reservoir pens, such improvements, that the cap itself becomes a suction member for filling the reservoir when reciprocated by the user of the pen.

Broadly considered, the invention consists in the combination with the reservoir, of a movable cap having an air vent or vents, so arranged that it or they can be opened and closed in such manner that, on the suction stroke of the cap, said vent or vents being closed, a partial vacuum will be formed in the cap and reservoir, whereby ink will be drawn in, and, on the reverse stroke of the cap, the vent or vents will be open and compression of the air avoided which, were the said vent or vents then closed, might spatter the ink out of the reservoir and the ink receptacle.

The invention also consists in the combination of the vented cap with a reservoir provided with an adjustable closure, adapted to be opened when the user is filling the reservoir with ink to permit of the necessary suction, and to be closed when the reservoir is filled to prevent leakage of ink.

The invention also consists in the combination with the vented cap of a reservoir provided with a float adapted to prevent leakage or spattering of ink during the filling of the reservoir, and to be dislodged from its seat after the reservoir is full.

The invention also consists in the combination with a vented reservoir of a vented cap provided with a valve adapted to automatically close the vent in the cap on the suction motion of the cap, and to automatic-

ally open the said vent on the reverse motion of the cap.

The invention also consists in various novel parts and combinations of parts, as will be evident from the description and various of the claims hereinafter contained.

The invention is applicable to all reservoir pens, and as well to fountain as to stylographic pens; and for simplicity of illustration the drawings which accompany the specification show several forms of the invention applied to fountain pens.

Referring to the said drawings to aid the description, Figure 1 is a longitudinal broken section and elevation of a fountain pen equipped with one form of the invention. Figs. 2 and 3 are respectively cross sections on the planes of the lines 2-2 and 3-3 of Fig. 1, and on a larger scale. Fig. 4 is a sectional detail of one form of a valve for the cap. Fig. 5 is a plan of the end of the cap, on an enlarged scale, and showing vent holes. Fig. 6 is a longitudinal section of the float valve in the reservoir. Fig. 7 is a sectional elevation of a cap showing a modified form of valve. Fig. 8 is a detail of the adjustable closure.

Referring to the preferred form of the invention shown in Figs. 1 to 6 inclusive, A is the reservoir and B the pen of a reservoir pen. The cap C is provided with a valve 3 opening outwardly and seating on a suitable seat 5. I prefer that said valve 3 and seat 5 shall be conical, and that the upper flat face of said valve shall be provided with air inlet grooves 4; and for ease of construction, I chamber the outer end of said cap C, as at *e*, and provide the end of said reservoir with a plug F threaded into said chamber *e*, and having a through vent or vents 1-1. The bore in the lower part of said cap C is of such size, shape and smooth surface, as to fit practically air tight, but with working fit, on the upper smooth and true turned end of said reservoir A; and I may insure a practically air tight fit of said cap on said reservoir by providing the said reservoir with a washer 9, of rubber, felt, or other suitable material, making air tight fit with the bore of said cap C.

I prefer to provide the upper end of said reservoir A with an air inlet and vent controlled by an adjustable closure, the preferred construction being as follows: Into the upper end of said reservoir A, threads

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 5 a chambered and conically-bored plug E, and into the chamber of said plug E threads the adjustable closure, or valve plug D, the threaded neck 6 of which is cut away at one side to form a small air passage 7, (Figs. 1 and 3). When said closure D is turned home the end of said reservoir A is closed by the surface 10 against leakage, and when said closure D is more or less open, as shown in Fig. 1, the air passage 7 is also opened. Said bore 12 of said plug E is preferably conical to admit, with tight fit, the conical neck 14 of a hollow float valve 13; and said closure D is provided with a downwardly projecting stem 8, adapted, when said closure D is turned home, to press against the end of said neck 14 and dislodge said float valve 13 from the bore 12 of said plug E, should it be necessary to use force to dislodge said float valve 13. I can, however, dispense with any such stem 8 or other special means for dislodging said float valve 13, and can, in fact, dispense with said float valve 13, although I prefer to use said float valve 13 and said stem 8.

Any suitable material for the several parts can be used, and I prefer to employ hard rubber for the reservoir, the cap, the valve, float, closure and various plugs, as being non-corrodible, easily worked and of sufficiently low specific gravity to serve for the valve and float.

The whole operates as follows: Supposing it is desired to fill the reservoir A with ink, the cap C will be placed on the upper end of said reservoir A, the adjustable closure D being open, the pen B and lower end of the said reservoir being properly immersed in the ink of a suitable receptacle; then the user will reciprocate the cap C a few times, valve 3 closing on each up stroke of the cap, so that ink is sucked into the reservoir A, and opening on each down stroke thereof, so as to avoid such compression of the air in the cap or reservoir as would expel the ink from the said reservoir or receptacle. On the last up stroke of the said cap, which fills the reservoir as desired, the neck 14 of said float valve 13 lodges in the bore 12 of said plug E, and closes the same to prevent ink from flowing up through said bore and passage 7 into said cap D. Said reservoir A being now filled with ink, it is removed from the ink receptacle, the cap C is taken off from the end of said reservoir A, and the closure D is turned home, closing the end of

said reservoir A against leakage of ink, and the end of said stem 8 pressing against the end of neck 14 and dislodging said float 13 from said bore 12.

In Fig. 7, the cap C is shown provided with a ball valve 18, seating on a suitably formed seat, other features of construction being similar to those hereinafter described.

I prefer to provide the lower end of said reservoir A with threads as shown to be engaged by threads on the interior of said cap C, as shown in Fig. 1, so that said cap will be screwed and not slid to place on the pen end of said reservoir, but I may of course omit said threads, and I might also, of course, place the valve in the reservoir instead of in the cap, without departing from my invention.

A further important advantage of my invention is that when the valve cap is on the pen end of the reservoir, and the filled pen is lying in stock in an inclined position in the usual manner, the valve in the cap remains closed, and thereby prevents evaporation, and insures that the pen will immediately and positively respond when first coming into contact with paper for writing.

Now having described my improvements, I claim as my invention.

1. The combination in a self-filling pen, of a reservoir, an adjustable closure therefor, a cap movable on said reservoir, and a valve in said cap adapted to close on the suction stroke of the cap and open on the reverse stroke thereof.

2. The combination in a reservoir pen of a vented reservoir, a cap movable thereon and provided with an opening adapted to be closed on the suction stroke of the cap, and opened on the reverse stroke thereof, and a valve in said reservoir adapted to close and prevent the escape of ink on said suction stroke of the cap.

3. The combination in a self-filling pen, of a reservoir, an adjustable closure therefor, a vented cap movable on said reservoir, and a valve in said cap adapted to be opened and closed as the cap is reciprocated.

Signed at the city of New York, in the county of New York and State of New York this 3rd day of August A. D. 1909.

WILLIAM W. SANFORD.

Witnesses:

G. W. HOPKINS,
 WALTER N. HARRIS.