Oct. 28, 1941. G. E. JOHNDOHL 2,260,571

FOUNTAIN PEN

Filed July 23, 1940

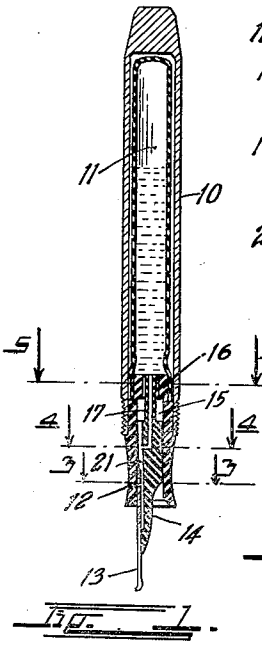

Fig. 1.

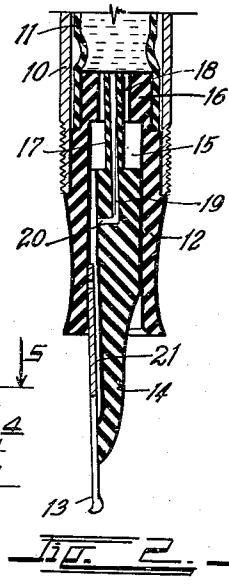

Fig. 2.

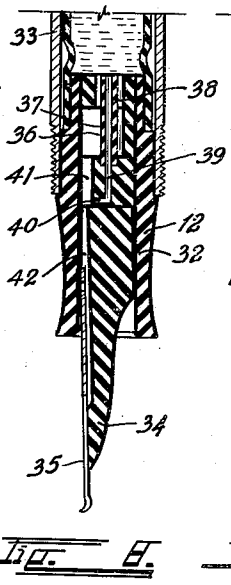

Fig. 8.

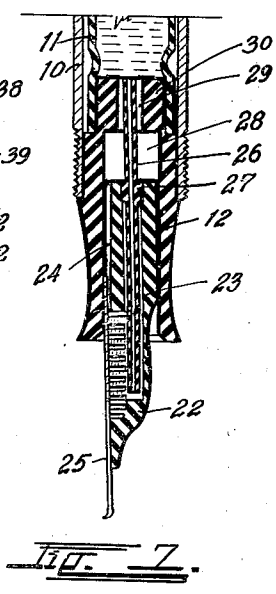

Fig. 7.

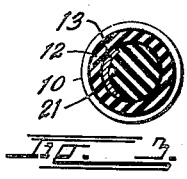

Fig. 3.

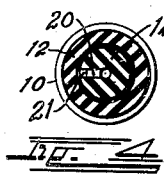

Fig. 4.

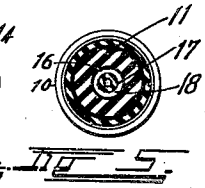

Fig. 5.

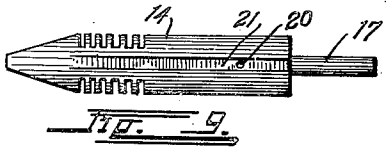

Fig. 9.

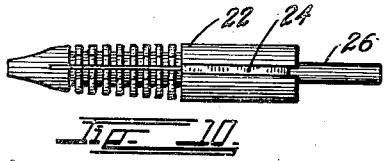

Fig. 10.

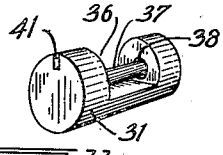

Fig. 11.

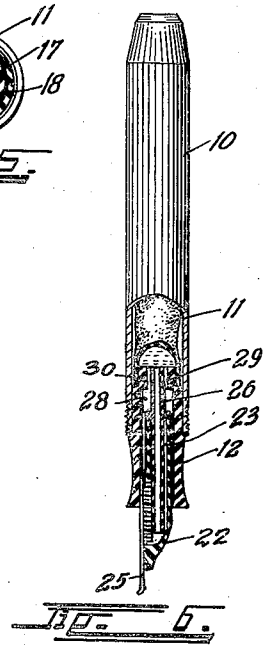

Fig. 6.

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FOUNTAIN PEN

Glenn E. Johndohl, Denver, Colo.

Application July 23, 1940, Serial No. 346,890

6 Claims. (Cl. 120—50)

This invention relates to an improvement in fountain pens and has for its principal object the provision of a fountain pen which will supply a uniform flow of ink to the pen point while the pen is in use; which will not flood when the pen is not in use; and which will start to write immediately after a long period of disuse.

In the usual fountain pen, the air bubbles entering to displace the ink interferes with the flow of the discharging ink causing a broken and uncertain flow. This air also must act against the entire weight of the ink in the pen in order to force itself through the ink passage to the reservoir. It is often unable, due to capillary adhesion in the narrow passage, to counteract this weight and remains entrapped in the ink discharge passages preventing further discharge of the ink.

An object of this invention is to provide a construction in which the entering air will not interfere in any way with the discharging ink and in which the air will not be required to operate against the weight or pressure of the ink in the pen.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a longitudinal section through a fountain pen illustrating one method of incorporating the invention therein.

Fig. 2 is a magnified sectional view of the point extremity of the pen of Fig. 1.

Figs. 3, 4, and 5 are cross sections through the pen of Fig. 1, taken on the section lines of corresponding number in the latter figure.

Fig. 6 is a side view partially in section through a fountain pen illustrating an alternate method of incorporating the invention in a fountain pen.

Fig. 7 is a magnified sectional view of the tip extremity of the pen of Fig. 6

Fig. 8 is a similar magnified sectional view illustrating the invention applied to a typical standard pen.

Fig. 9 is a detail plan view of the feeder member used in the pen of Figs. 1 and 2.

Fig. 10 is a detail plan view of a second form of feeder member as used in the pen of Figs. 6 and 7.

Fig. 11 is a detail view of an adapting device for adapting present fountain pens to the new construction.

The fountain pen illustrated in Figs. 1 to 5 inclusive consists of a barrel 10 containing the usual ink sack 11. The ink sack 11 is secured on the inner extremity of a pen holder or pen-receiving bushing 12 in which a pen 13 is wedged by means of a feeder member 14. The member 14 contains an ink channel 21 for conveying ink to the pen 13.

As thus far described, the fountain pen is of the usual construction, the bushing is forced into the lower extremity of the barrel to seal the latter and any suitable filling device may be employed for filling the ink sack 11. In certain types of pens the sack 11 is eliminated and the ink is filled directly into the barrel. The invention would function equally well on this type of fountain pen.

In applying this invention, the upper extremity of the bushing 12 is closed by means of a relatively thick head 16 and an air chamber 15 is formed between the feeder member 14 and the head 16. An ink tube 17 extends axially through the air chamber 15 and through the head 16. The head is drilled for the passage of the ink tube and this drill opening is of larger diameter than the ink tube so as to leave a cylinder-shaped air passage 18 entirely around the ink tube 17 where it passes through the head 16. The ink tube 17 contains an ink passage 19 which extends a relatively short distance into the feeder member 11 and then extends outwardly at right angles to form an ink port 20 above the pen 13 in the channel 21.

While the invention is not limited to exact sizes it has been found by long experimentation that the sizes and dimensions are of extreme importance. For instance, it has been found that the invention works at its greatest efficiency if the distance between the port 20 and the inner extremity of the feeder member 14 is $\frac{3}{16}$'' and if the length of the air chamber 15 and the length of the cylindrical air passage 18 are both similarly $\frac{3}{16}$''. The diameter of the ink tube is slightly larger than $\frac{1}{16}$'', to wit, .067''. The bore in the head 16 is .125''. This forms the cylindrical air passage of .029'' width around the ink tube.

When the pen is in use, ink flows downwardly through the ink passage 19 and discharges through the port 20 into the ink channel 21. The air flows upwardly about the pen, about the feeder member 14, and through the channel 21 into the chamber 15. From the chamber 15, it flows upwardly through the cylindrical air passage 18 into the ink sack 11.

No ink flows downwardly through the air pas-

sage 18. The reason for this is believed to be that, due to the capillary attraction, the ink can more readily flow through the tubular ink channel 19 than through the relatively thin cylindrical channel 18. It is also possibly due to the fact that the ink cannot follow by capillary attraction outwardly around the sharp inner corner of the air passage at the point where it enters the air chamber 19. But, regardless of cause, it is a fact, demonstrated with transparent structures, that the ink does not naturally flow into the chamber 15.

The air in passing upwardly in the passage 21 does not encounter the entire weight of the ink and can readily flow to the chamber 15 without interference so as to maintain the air in the chamber at atmospheric pressure. The air will flow from the chamber into the ink sack through the air passage whenever the opportunity is presented due to the natural vibration and movements of the act of writing. It is desired to call attention to the fact that in this invention, no air is attempting to pass the ink flowing down the ink passage 19.

Occasionally, due to the extreme and sudden temperature changes or during filling operations the ink may be forced into the air chamber 15 but this ink is quickly discharged down the channel 21 to the pen during the first use thereafter and the chamber thereafter remains dry. This feature probably accounts for the fact that the improved fountain pen does not flood due to temperature changes since any expansion of the air in the sack is absorbed by expulsion of air from the chamber 15.

The above features can be incorporated in the fountain pen in many ways. In Figs. 6 and 7, the same features have been incorporated in a pen having a different type of feeder member. In this form, a feeder member 22 is employed having a passage 23 extending throughout its length. In the usual fountain pen this passage conveys both the ink and the air to and from the feeder member. In this invention, an air channel 24 is formed along the upper side of the feeder member, above a pen 25, and an ink tube 26 is extended downwardly through the passage 23 to a point immediately behind the pen 25. This tube is sealed to the feeder member by means of a sealing bushing 27. The tube 26 extends through an air chamber 28 and through a surrounding air passage 29 in a head 30 similarly to the previously described form.

The operation of this form is also similar, that is, ink flows down the tube 26 to the pen and air flows upwardly through the channel 24 to the chamber 28, thence through the air passage 29 to the ink sack.

For adapting present fountain pens to the improved construction of this invention, an adapter 31, such as shown in Fig. 11 is employed. The usual pen contains a tubular bushing 32 inserted in the lower end of the barrel 33. The bushing receives a feeder member 34 and a pen 35 of any design. To install this invention, the upper extremity of the usual feeder member 34 is cut away to leave room in the bushing 32 for the adapter 31. The latter is forced into the bushing to the upper extremity thereof and the feeder member 34 is then forced into place against the lower extremity of the adapter, as shown in Fig. 8.

The adapter comprises a cylindrical member having its mid-portion cut away to form an air chamber 36 through which an ink tube 37 passes. At the upper extremity of the adapter, the ink tube passes through a relatively larger air passage 38 and, at its lower extremity, the ink tube communicates with an ink passage 39 which opens to an ink port 40 in a longitudinal channel 41 cut in one side of the adapter. The air channel aligns with the usual feeding groove 42 in the feeder 44.

The operation of the adapted form is similar to the previously described forms. The ink flows downwardly through the ink tube and channel 39 and discharges from the port 40 immediately above the pen 45. The air flows upwardly past the port 40 in the channel 41 to the air chamber 36 and thence to the ink sack through the passage 38. No air enters the ink tube and no ink enters the air chamber 36.

When the fountain pen is carried in the user's pocket with the point uppermost, or in a woman's purse in a horizontal position, the ink from the passage 21 will drain back to the walls of the air chamber. The quantity of ink from the passage is so minute that it only moistens the walls of the chamber and leaves the interior free for air flow.

Any expansion in the reservoir contents simply forces air through the air chamber and through the evacuated passage 21 to the pen without extruding any ink. Thus, all cap flooding is entirely eliminated.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A fountain pen comprising: an ink reservoir; a pen holder at one extremity of said reservoir; a writing pen projecting from said holder; a feeder member in the lower extremity of said holder for feeding ink to said writing pen; a head in the upper extremity of said holder; an air chamber between said head and said feeder member; a first air passage through said head communicating between said reservoir and said chamber; a second air passage between said chamber and the atmosphere; an ink tube extending from said reservoir through said chamber to said feeder member; and an ink passage through said tube and through said feeder member to said pen.

2. A fountain pen comprising: an ink reservoir; a pen holder at one extremity of said reservoir; a writing pen projecting from said holder; a feeder member in the lower extremity of said holder for feeding ink to said writing pen; a head in the upper extremity of said holder; an air chamber between said head and said feeder member; a first air passage through said head communicating between said reservoir and said chamber; a second air passage between said chamber and the atmosphere; and an ink tube extending from said reservoir through said first air passage and through said chamber to said feeder member to supply ink to the latter, said first passage being larger than said tube to allow the air to flow around said tube.

3. A fountain pen comprising: an ink reservoir; a pen holder at one extremity of said reservoir; a writing pen projecting from said holder; a feeder member in the lower extremity of said holder for feeding ink to said writing pen; a head in the upper extremity of said holder; an air

chamber between said head and said feeder member; a first air passage through said head communicating between said reservoir and said chamber; an ink tube projecting from said feeder member through said air chamber and through said first air passage to said reservoir, said tube being smaller than said passage; a second air passage from said chamber through said feeder member to said writing pen; and an ink passage through said ink tube and through said feeder member to supply ink to said writing pen.

4. A fountain pen comprising: an ink reservoir; a pen holder at one extremity of said reservoir; a writing pen projecting from said holder; a feeder member in the lower extremity of said holder for feeding ink to said writing pen; a head in the upper extremity of said holder; an air chamber between said head and said feeder member; a first air passage through said head communicating between said reservoir and said chamber; an ink tube projecting from said feeder member through said air chamber and through said first air passage to said reservoir, said tube being smaller than said passage; a second air passage from said chamber through said feeder member to said writing pen; and an ink passage through said ink tube and through said feeder member to a port in said second air passage above said writing pen.

5. An adapter for fountain pens comprising: a plug-like member of a size to be fitted into a pen holder of a fountain pen above the writing pen and feeder thereof, said member having an air chamber with air passages from said chamber to both extremities of said member and an ink passage extending throughout the length of said member from one extremity to the other independent of said air chamber.

6. A fountain pen comprising: an ink reservoir; a pen holder at one extremity of said reservoir; a writing pen projecting from said holder; a feeder member in the lower extremity of said holder for feeding ink to said writing pen; an air chamber in said holder; a first air passage communicating between said chamber and said reservoir; a second air passage communicating between said chamber and said pen; an ink tube extending from said reservoir through said chamber to said feeder member; and an ink passage through said tube and through said feeder member to said pen.

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