Nov. 5, 1946. T. F. BRINSON 2,410,423

FOUNTAIN PEN

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Fig. 1.

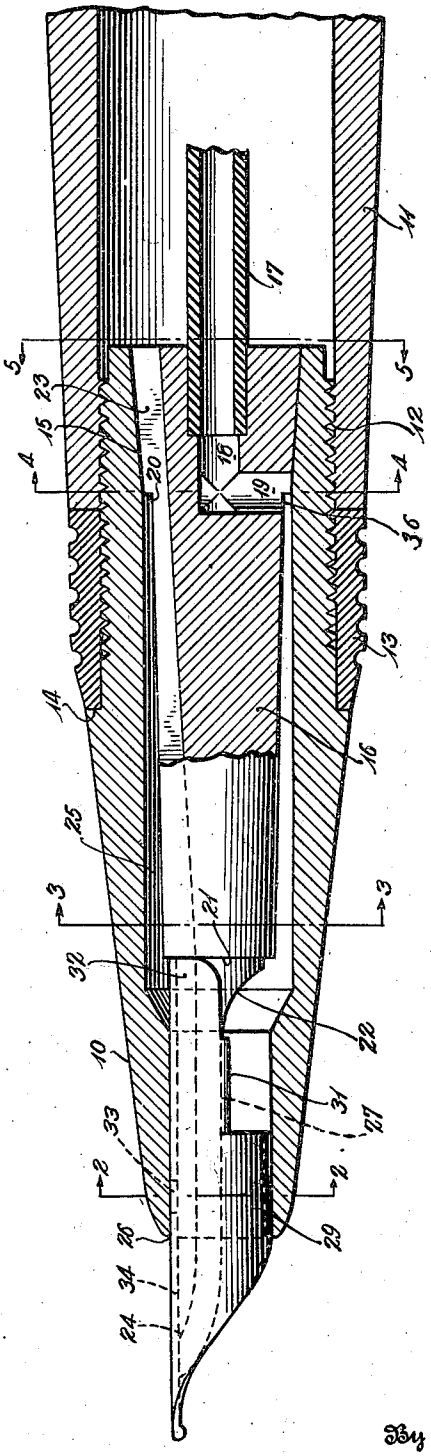


Fig. 3

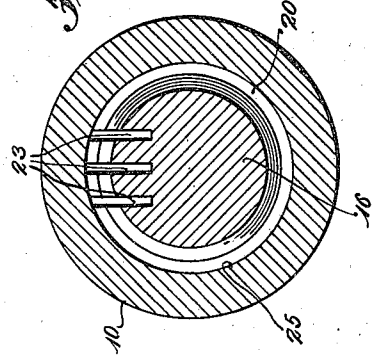
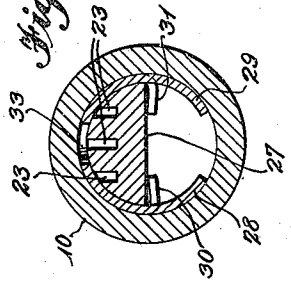


Fig. 2.



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Fig. 4.

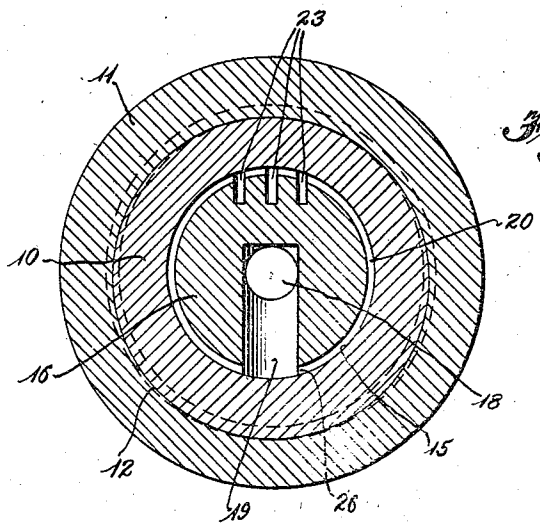


Fig. 5.

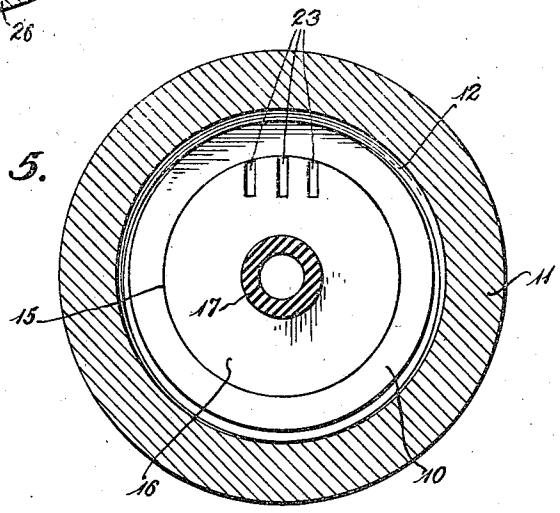
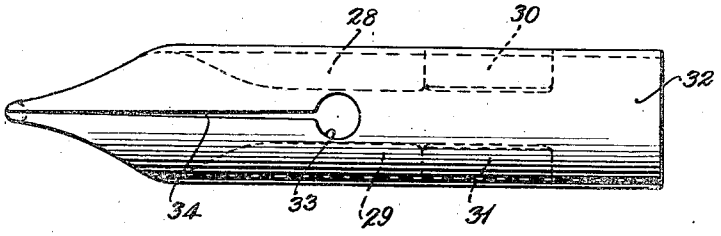


Fig. 6.



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FOUNTAIN PEN

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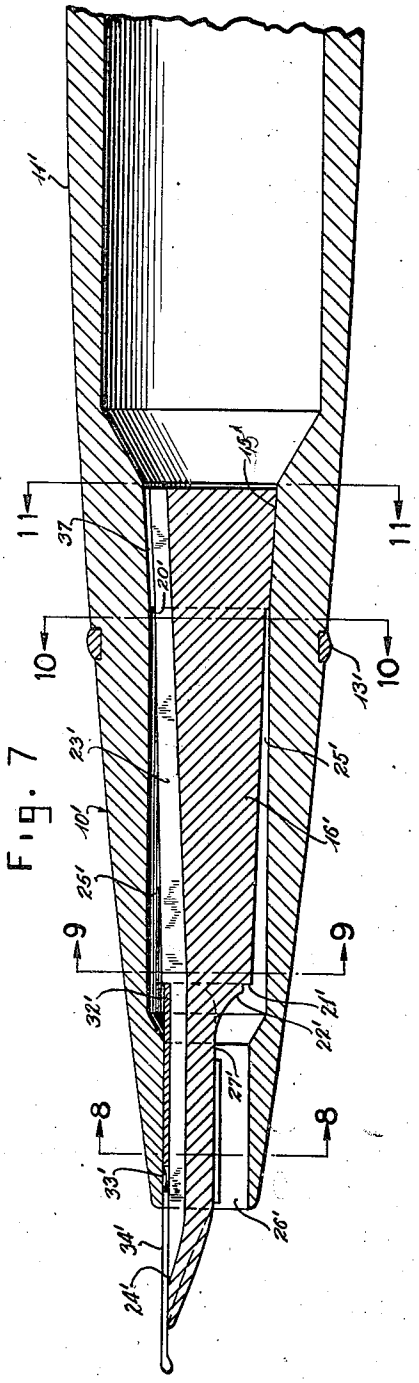


Fig. 7

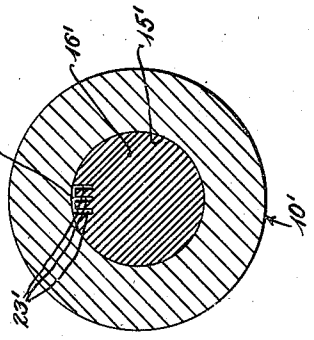


Fig. 11

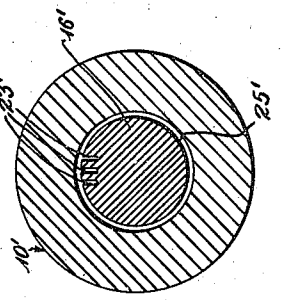


Fig. 10

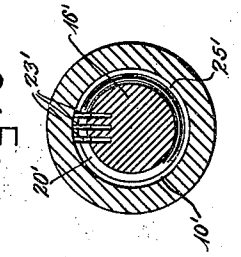


Fig. 9

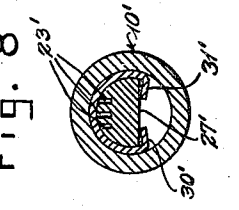


Fig. 8

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FOUNTAIN PEN

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Application October 14, 1944, Serial No. 558,674

15 Claims. (Cl. 120—50)

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The invention relates to fountain pens and has as an object the provision of a pen made up of parts of extreme simplicity.

Further objects of the invention are to provide a pen the parts of which are so shaped as to be capable of being all formed of molded plastic; to provide an improved ink feed having ample storage for any ink in excess of that required at the moment; to provide security against blotting by delivery of ink not required for writing; and to provide a feed-bar-supporting nib.

Further objects will appear from the following description when read in connection with the accompanying drawings showing an illustrative embodiment of the invention and wherein:

Figure 1 is a detail central section of the writing end of a pen showing the feed arrangement and drawn to an enlarged scale;

Figures 2–5 inclusive are vertical transverse sections on the corresponding section lines of Figure 1;

Figure 6 is a plan view of the nib of the invention;

Figure 7 is a view corresponding to Figure 1 showing an embodiment of the invention differing in details from that of Figure 1; and

Figures 8–11 inclusive are vertical transverse sections on the corresponding section lines of Figure 7.

As shown, the device comprises a barrel having a feed section 10 and a reservoir section 11. The invention is not concerned with the method of filling the pen and, therefore, the whole of the reservoir section is not shown. The reservoir section is shown as mounted upon the feed section at the screw threaded portions 12 of the two. Prior to the placing of the reservoir section a pen cap receiving sleeve 13 is shown as screwed upon the screw threads 12 which sleeve abuts with a shoulder 14 on the feed section.

The section 10 is formed interiorly with an internally frusto-conical surface 15 in which seats a complementary formed portion of the feed bar 16. The feed bar is formed with an opening to receive a vent pipe 17 which desirably extends to a point near the upper end of the reservoir section of the barrel, and the interior of said pipe forms a continuation of a bore 18 communicating with a cross bore 19 opening to the surface of the feed bar. From the end 20 of the frusto-conical portion of the feed bar the bar is of reduced size and preferably tapers to the end 21 of a solid portion thereof from which projects the nib receiving portion 22 of the bar.

To feed ink from the reservoir portion of the

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barrel to the nib, capillary passages 23 are provided, which passages in the form shown are three in number and which, or at least the central one thereof, terminates at the point 24 adjacent the forward end of the feed bar. To provide storage for ink in excess of that required at any particular time of writing an annular chamber is provided in the form of a space 25 which is formed by formation of the interior of the feed section of the barrel of larger diameter than the exterior of the feed bar.

To admit air to the pen an opening of considerable size is provided within the end 26 of the feed section of the pen below the flattened lower surface 27 of the nib receiving portion of the pen and air passing to the reservoir flows along the lower portion of the space 25 to enter the cross bore 19 at 36 where a portion of the bore opening is exposed by the reduced diameter occurring at the plane 20 whereat the frusto-conical portion of the feed bar terminates.

The storage space for excess ink at 25 is formed of capillary size so that ink therein will not flow therefrom by gravity, which ink will only be fed out of this storage space as it flows to the writing end of the nib by means of the passages 23. It will, therefore, be seen that presence of ink in the space 25 will prevent access of air to the vent pipe 17 and therefore an added supply of ink cannot leave the reservoir until the ink in the storage space is exhausted. To support the forward end of the feed bar a special form of nib is provided by the invention. This form of nib comprises a pair of arcuate wings 28, 29 and a second pair of wings 30, 31 which are struck from the material of the nib in its formation. The wings 28, 29 bearing upon the interior of the feed section 10 support the nib which in turn by means of wings 30, 31 supports the feed bar in the storage space 25 and prevents possible breakage of the reduced end of the same.

The nib as shown, in addition to the wings referred to, comprises an arcuate portion 32 riding upon the top of the feed bar with the usual perforation 33 and slit 34 formed therein. The feed bar therefore, except for the opening receiving the vent pipe 17 and the portions 18 and 19, and with the exception of the capillary passages 23, is a solid body. All the described portions of the pen are such as to be readily molded from a synthetic plastic by the injection molding method. The opening within the arcuate wings 28, 29 at the forward end of the feed section is ample for air supply, and the extreme simplicity of the parts is readily apparent.

In the form of the invention shown in Figures 7 to 11 inclusive the feed section 10' and the reservoir section 11' are shown as formed integrally. To coact with a pen cap not shown, a band 13' is shown seated in a recess in the periphery of the barrel, which band may be swaged into the recess or placed in any other desired manner.

In this form of the invention the vent pipe 17 and the bores 18 and 19 are omitted. To vent air into the reservoir section a shallow channel 37 is provided in the frusto-conical enlarged portion of the feed bar 16', through which channel air may pass to the reservoir over the ink flowing to the nib by way of the channel or channels 23'.

In this form of the invention also the wings 28, 29 of Figures 1 and 6 are omitted and the wings 30', 31' are extended to a point adjacent the end 26' of the barrel of the pen. To support the nib carrying portion of the feed bar and to center the central portion thereof the thickness of the front end of the feed bar plus that of the nib and wings is such as to bear in the opening of the barrel below its horizontal diameter as seen in Figure 8.

In operation of the described structure, ink from the reservoir 11 flows to the writing point through the passages 23. Since the air vent is open to the atmosphere at 26' Figure 7 and correspondingly in Figure 1, ink will continue to flow from the reservoir 11 or 11' into the passages 23 or 23' to the end 20 or 20' of the storage space 25 or 25' until a film of ink is formed over the air vent opening 26 or 37. When either of these openings is closed ink will stop flowing because no more air can be admitted to the reservoir 11 until the ink film blocking the opening has been broken by a demand for ink at the writing point.

Should the air on top of the ink in the reservoir 11 be unduly heated by body temperature or by other outside causes, the increase in pressure will force an excessive amount of ink from the reservoir 11 by way of the passages 23, filling the storage space 25, from the end 20 toward the end 21 since the width of this space 25 increases gradually from the end 20 to the end 21. If the storage space 25 is filled or partially filled, when writing with the pen the ink in this space 25 must first be used before additional ink can flow from the reservior 11 because the air vent is blocked at 26 or 37.

The passages 23 are open on one side to the space 25 throughout its length from end 20 to end 21. However, as can be seen by those skilled in the art, ink will not flow from these passages 23 into space 25 without an increase in pressure on the air above the ink supply in the reservoir 11. This flow is prevented by the edge effect since the width of the space 25 at the end 20 is greater than the width of the passages 23.

As ink is used from the passages 23 in writing, any ink in the space 25 will enter the finer capillary passages 23 and flow to the writing point until the air vent is opened at 26 or 37. Then air is admitted to the reservoir 11, and a new ink supply flows through passages 23 and into the space 25 until the opening is again blocked.

Minor changes may be made in the physical embodiments of the invention within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. In a fountain pen: a barrel comprising a reservoir section and a feed section; a feed bar supported by and in said feed section; a nib associated with said bar and feed section; a portion of the interior of said feed section spaced from the surface of said bar to provide an excess ink storage space of capillary dimensions; said feed bar formed with ink supply duct means extending from the interior of the reservoir section to a position adjacent the point of said nib and freely opening into said space substantially throughout the length of the latter; and means providing an air vent from said storage space to said reservoir section.

2. The structure of claim 1 in which the air vent opens from said storage space at a point closely adjacent the portion thereof nearest the reservoir.

3. The structure of claim 1 in which the air vent means delivers the air to the space in the reservoir at a position remote from the duct means opening thereunto.

4. The structure of claim 1 in which the ink storage space is of reduced transverse dimensions adjacent the ink reservoir.

5. In a fountain pen: a barrel comprising a feed section and a reservoir section; a feed bar formed with an enlarged end portion rigidly seated in the end of the feed section adjacent the reservoir section; said feed bar also formed with a portion of reduced diameter, the periphery thereof spaced from the interior of the feed section to provide an excess-ink storage space of capillary dimensions and a still further reduced nib carrying portion projecting through the writing end of the feed section and spaced from a portion thereof to admit vent air; a nib carried by said feed bar; said bar formed with ink supply duct means opening into said reservoir section, said storage space, and to the nib carrying portion of the feed bar; and means providing vent of air from said storage space to the ink reservoir.

6. The structure of claim 5 in which the enlarged seating portion of the feed bar is frusto-conical and held by friction in a complemental seat in the feed section.

7. The structure of claim 5 in which the interior of the portion of the feed section surrounding the nib carrying portion of the feed bar is substantially reduced in diameter from that of the ink storage space.

8. In a fountain pen: a barrel comprising a reservoir section and a feed section; a feed bar formed with an enlarged end portion seating in the said feed section adjacent its reservoir end; the remaining end of said bar formed to receive a nib, and projecting through the writing end of the feed section; the intermediate portion of said bar spaced from the interior of the feed section; and a nib formed with portions underlying the nib receiving portion of the feed bar to provide rigid engagement therewith and acting to maintain normal relative positions of the bar and feed section.

9. The structure of claim 8 in which the underlying portions of the nib are in the nature of wings bent from the material of the nib.

10. In a fountain pen: a barrel comprising a feed section having a hollow writing end; a feed bar seated in said feed section and formed with a nib receiving portion projecting through and substantially filling a portion only of said hollow end providing an opening from the interior of the section to atmosphere; a nib seated on said bar within said opening and formed with a portion underlying and in contact with the nib receiving portion of the feed bar, and with a portion adapted to contact the unfilled portion of the

hollow end portion to prevent harmful movement of said bar in the section; said feed-section-contacting portion spaced from the feed bar to preserve the air vent opening.

11. In a fountain pen: a barrel comprising a reservoir section and a feed section; said feed section interiorly formed with a feed bar seat, an ink storage chamber forming space and a reduced hollow extremity at its writing end; a feed bar having an enlarged portion engaged in said seat, a reduced diameter portion housed in said space to provide an ink storage space of capillary dimensions and a nib receiving portion of still further reduced transverse dimension projecting through said hollow extremity; a nib seated on said last named portion; said nib formed with means to hold said nib receiving portion in normal radial position relative to said hollow extremity.

12. The structure of claim 11 with said bar formed with an air vent bore through said enlarged portion, and a cross bore extending from said vent bore and opening into said space, and with ink supply duct means extending from the reservoir end thereof to a position under the nib and open to said storage space.

13. A fountain pen comprising: a barrel interiorly formed to provide an ink reservoir chamber and an excess-ink storage chamber; a feed bar, a portion thereof seated in the barrel between said chambers and thereby separating the same; a second portion of said bar formed with ink duct

means and with its surface otherwise uninterrupted and spaced from the inner surface of said storage chamber to provide a storage space of capillary dimensions; said barrel formed with a hollow writing end portion of reduced inner diameter opening into said storage chamber; an end portion of said bar projecting through said hollow writing end; a nib mounted between said bar and barrel end portions; and air vent means connecting said chambers.

14. A nib comprising a substantially semi-cylindrical bar engaging portion terminating in a writing point; a pair of wings integral with said bar engaging portion to underlie and support a feed bar and a pair of wings integral with and lying in an extension of the semi-cylindrical surface bar engaging portion.

15. In a fountain pen, in combination: a barrel comprising a reservoir section and a feed section; the interior of said barrel formed with a substantially cylindrical reservoir space, a frusto-conical feed bar seat, a substantially cylindrical feed bar enclosing chamber of less diameter than said reservoir space and a still further reduced substantially cylindrical nib receiving space; a feed bar having a head supported in said seat, a tapering portion with its surfaec spaced from the wall of said chamber to provide an ink storage space of capillary dimensions and a nib carrying portion partially filling said nib receiving space; and a nib carried by said latter portion.

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