

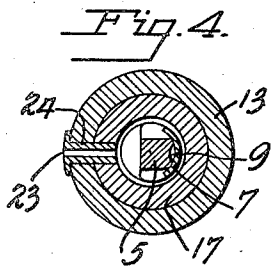
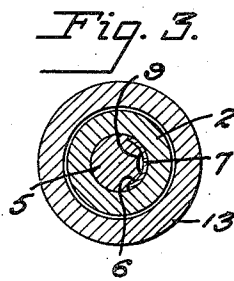
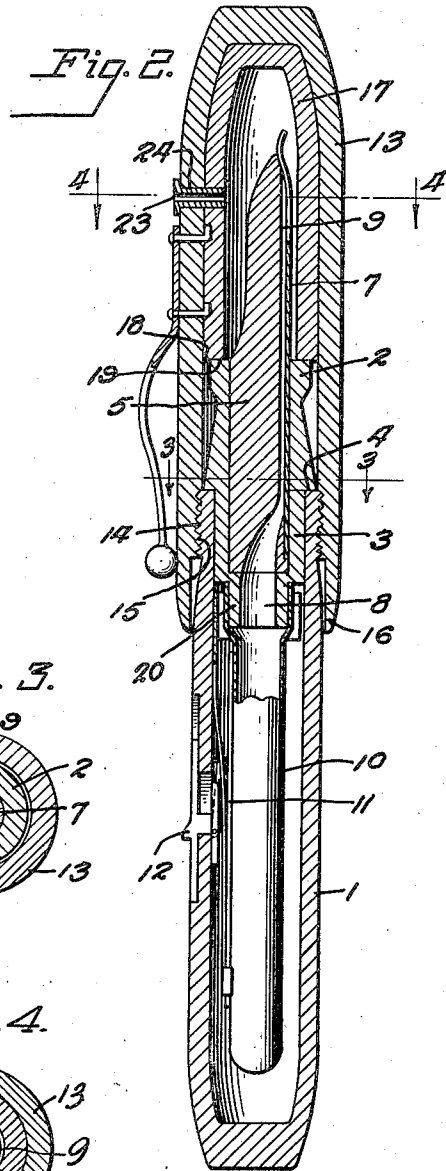
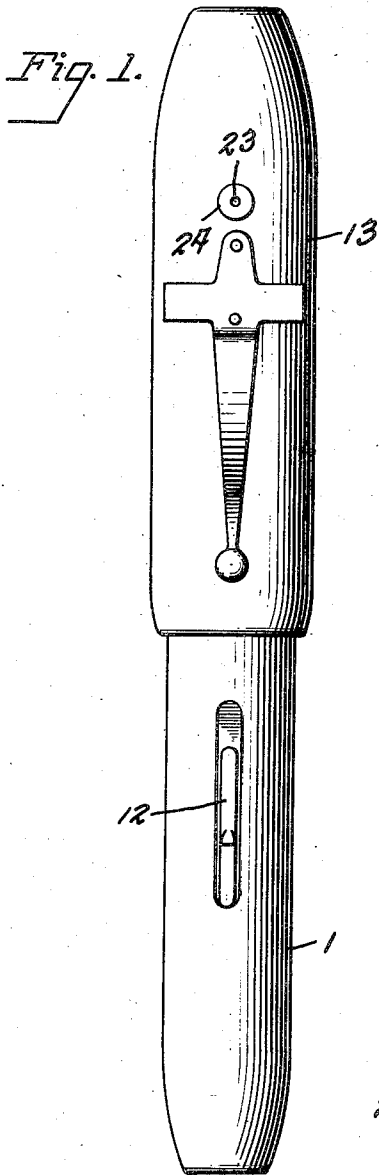
June 14, 1938.

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2,120,652

FOUNTAIN PEN

Filed Aug. 11, 1937



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# UNITED STATES PATENT OFFICE

2,120,652

## FOUNTAIN PEN

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Application August 11, 1937, Serial No. 153,568

5 Claims. (Cl. 120-42)

This invention relates to fountain pens and has for its object to enhance the non-leaking qualities of such pens.

It is a matter of common knowledge that the cap of a fountain pen encloses a considerable body of air, enveloping the point or nib end of the pen, which air in the absence of a vent undergoes pressure variations through temperature changes external to the pen which either force or draw ink out of the feed into the cap. Another cause of leakage is that when the cap is pulled off suddenly, vacuum is momentarily created which draws out the ink.

It has been attempted to prevent such leakage by providing a small hole in the cap, thus venting the interior thereof, and this did very well for the class of pens employing a cap without an inner seal. The provision of the single vent did not however prevent gravitational leakage which occurs if the pen should be carried inverted in the pocket, and a later development in fountain pen construction was the provision of an inner cap, the lower end of which forms a shoulder within the outer cap, seating against the annular end of the pen section of the barrel to form a positive seal preventing such ink as might leak into the inner cap from spreading to the outer cap and upon the portion of the barrel contacted by the fingers in writing.

While the isolation of the space within the inner cap from that within the outer cap is successful in retaining in the inner cap such ink leakage as may occur by way of the feed and nib of the pen, it gives rise to pressure variations within the chamber of the inner cap due to external temperature changes which draws ink out through the feed into the inner cap and although the nuisance of this leakage has been endured for a number of years, not until the present invention has anything been done successfully to prevent it, and providing complete ink control. The present invention does this by providing a vent for the isolated air chamber within the inner cap.

Other objects of the invention will appear as the following description of a preferred and practical embodiment thereof proceeds.

In the drawing throughout the several figures of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a view in elevation of a fountain pen embracing the principles of the present invention;

Figure 2 is a longitudinal section;

Figure 3 is a cross section taken along the line 3-3 of Figure 2;

Figure 4 is a cross section taken on line 4-4 of Fig. 2.

Referring now in detail to the several figures the numeral 1 represents the barrel of the pen, open at one end and closed at the other, 2 being the pen section which has a reduced cylindrical portion 3 telescoping tightly into the open end of the barrel 1. The pen section has a shoulder 4 which abuts against the end of the barrel and limits the intrusion of the cylindrical portion 3.

The pen section is provided with a bore into which is forced the feed 5. Said feed has a recess formed longitudinally along one side as indicated at 6 in Figure 3, receiving the pen point or nib 7. The feed is provided with a bore 8 in its upper end which bore debouches into a longitudinal channel 9 behind the nib 7. The flexible rubber sack 10 is slipped over the reduced end 20 of the pen section, to which it is secured in a fluid-tight manner. Leverage for squeezing the sack is indicated in general by the reference character 11, said leverage being operated by a slide 12 set into a recess in the outer surface of the barrel.

An outer cap 13 is provided having a threaded zone 14 which cooperates with the correspondingly threaded zone 15 surrounding the open end of the barrel. Within the outer cap is an inner member or cap 17, the inner cap terminating midway of the length of the outer cap and the terminal edge 18 of the inner cap abutting against the annular end 19 of the pen section in a fluid-tight manner.

So much of the structure as has been described may be considered conventional, and it will be apparent that air in the isolated air chamber in the inner cap will be subject to pressure variation due to outside temperature changes, and leaking of ink will occur when the pressure in said chamber is exceeded by atmospheric pressure of the air surrounding the cap, when the air content of the inner cap is cooled, and there also occurs, when that air content is warmed, a receding or driving of ink back through the feed channel into the ink sack thus depriving the feed channel of the normal ink therein, so that the pen is not ready for writing in such an event. The vent obviates both of these conditions.

The present invention obviates such pressure variations as may occur within the inner cap by means of a vent 23 placing the chamber within

the inner cap in communication with atmosphere. As the inner cap is generally made separate from the outer cap and merely held in place by friction, it may shrink and become loose and shift relative to the outer cap, particularly when the outer cap is screwed upon the pen, I prefer to line the vent 23 with a bushing 24 intersecting the engaging surfaces of the inner and outer caps to prevent them ever getting out of alignment. The vent 23 is preferably on the same side of the cap as the clip in which position when the pen is clipped to the pocket, the vent will always be turned outward and exposed for unimpeded air circulation or access to air. Pressure variations due to outside temperature changes also occur in the sack or reservoir 10 containing the supply of ink, particularly when the ink supply is partially exhausted. When the pen is not in use or being carried in the upright position ink always remains in the feed. The air in the feed will expand or contract due to outside atmospheric conditions and the ink in the feed will either be driven out of the feed so as to cause leakage or sweating or be forced back to the sack and the pen will not write without shaking or waiting until the ink flows back into the feed. The vent likewise obviates these conditions.

While I have in the above description disclosed what I believe to be a preferred and practical embodiment of the invention, it will be understood to those skilled in the art that the details of construction and arrangement of parts as shown and described are merely by way of example, and not to be construed as limiting the scope of the invention as claimed.

What I claim is:

1. A closure of the safety screw cap type for a fountain pen, said closure comprising a two-piece cap consisting of an outer cap having a threaded portion spaced from the open end thereof for engaging a correspondingly threaded portion on the barrel of the fountain pen, an inner member, one end of which abuts the end of the pen section so as to effect a seal therewith and form an isolated chamber extending from the end of the pen section to the top of the cap for the pen point and feed, and a vent opening passing through said two-piece cap for placing said chamber in communication with atmosphere so as to eliminate pressure variations in said chamber and provide complete ink control.

2. A closure of the safety screw cap type for a fountain pen, said closure comprising a two-piece cap consisting of an outer cap having a threaded portion spaced from the open end thereof for engaging a correspondingly threaded portion on the barrel of the fountain pen, an inner member, one end of which abuts the end of the pen

section so as to effect a seal therewith and form an isolated chamber extending from the end of the pen section to the top of the cap for the pen point and feed, and a vent opening passing through said two-piece cap for placing said chamber in communication with atmosphere so as to eliminate pressure variations in said chamber and provide complete ink control, the wall of said vent being constituted by a bushing passing through both members of said two piece cap and holding them to prevent displacement in relation to each other.

3. A closure of the safety screw cap type for a fountain pen, said closure comprising a cap having a threaded portion spaced from the open end thereof to engage a correspondingly threaded portion on the body of the fountain pen, a shoulder formed approximately midway of said cap, said shoulder being adapted to abut and effect a seal with the end of the pen section when said threads are tightened so as to form an isolated chamber extending from the end of the pen section to the top of the cap for the pen point and feed, and a permanent vent placing said chamber in communication with atmosphere so as to eliminate pressure variations in said chamber and provide complete ink control, said vent being located in the side wall of the closure in the region of the end of the pen point.

4. A closure of the safety screw cap type for a fountain pen, said closure comprising a two-piece cap consisting of an outer cap having a threaded portion spaced from the open end thereof for engaging a correspondingly threaded portion on the barrel of the fountain pen, an inner member, one end of which abuts the end of the pen section so as to effect a seal therewith and form an isolated chamber extending from the end of the pen section to the top of the cap for the pen point and feed, and a vent opening passing through said two-piece cap for placing said chamber in communication with atmosphere so as to eliminate pressure variations in said chamber and provide complete ink control, the wall of said vent being constituted by a bushing passing through both members of said two-piece cap and holding them to prevent displacement in relation to each other, said bushing being located in the side wall of the closure in the region of the end of the pen point.

5. A fountain pen closure comprising an outer cap, an inner cap, the open end of said inner cap terminating approximately midway of said outer cap, and a bushing passing through both outer and inner caps, said bushing acting as a vent and as a means for preventing displacement of one cap in relation to the other.

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