Nov. 22, 1955 B. F. MIESSNER 2,724,366

NON-LEAKING AND FLOODING FOUNTAIN PEN

Filed July 2, 1951

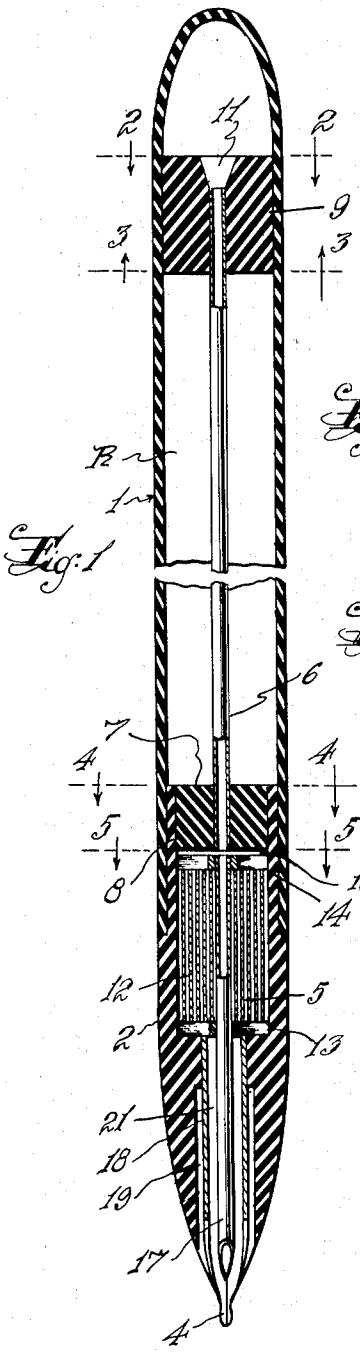


Fig. 1

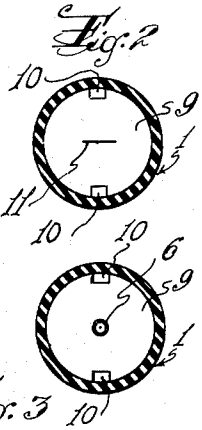


Fig. 2

Fig. 3

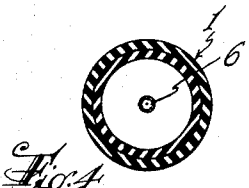


Fig. 4

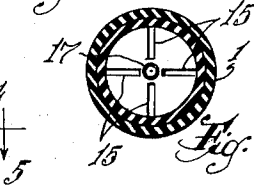


Fig. 5

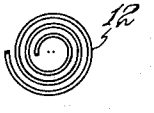


Fig. 6

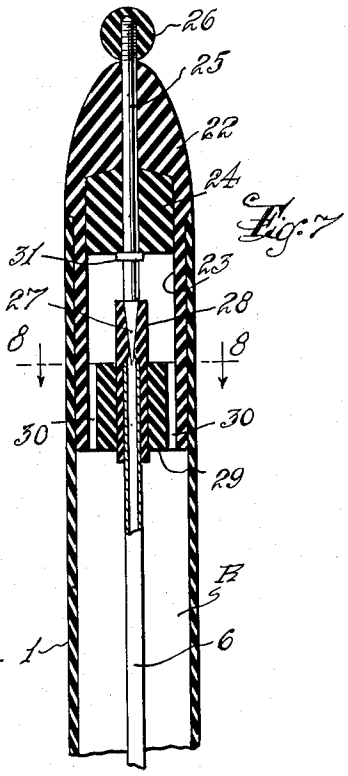


Fig. 7

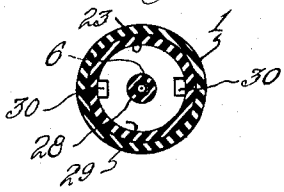


Fig. 8

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NON-LEAKING AND FLOODING FOUNTAIN PEN

Benjamin F. Miessner, Morristown, N. J.

Application July 2, 1951, Serial No. 234,708
5 Claims. (Cl. 120—42.16)

This invention relates to fountain pens and more particularly to a novel and useful pen, non-flooding and non-leaking when under the influences of temperature or barometric pressure variations. The present invention more particularly is an improvement on the inventions disclosed in my patent applications Serial Nos. 167,237, filed June 9, 1950, and now abandoned, and 206,678, filed January 18, 1951, and now Patent Number 2,642,041, which describe such pens having nipple valves in the ink and air paths which connect the ink reservoir with the ink collector and writing point feed devices. Said valves are made of such flexible materials as soft rubber, and are provided with a radial-axial slit on the reservoir side which may be squeezed open by opposed radial pressures applied parallel to this slit on the sides of the rubber valve, or on the outside of a radially-flexible surrounding pen barrel.

In the above copending patent applications, I have shown such valves situated between the pen barrel and the ink collector, so that these types of pens require a special filling technique.

In my copending patent application Serial No. 230,378, filed June 7, 1951, and now Patent Number 2,694,382, I have shown a novel method of filling such pens through the top end of the barrel via an axial connecting tube. The present invention provides an arrangement and location of the nipple valve which permits filling of the pen through the point end, as in conventional practice. The nipple type valve is located in one form near the top end of a radially-flexible barrel and connected ink tight to the ink collector and the pen point feed elements, by an axial tube which passes, ink tight, through a plug situated between the barrel reservoir and the collector. With this arrangement, squeezing pressure applied across the slit ends of the nipple valve, exerted via the flexible barrel reservoir walls, opens the nipple valve and at the same time compresses the air in the reservoir so as to expel it. Release of this pressure allows ink to flow into the reservoir, in the filling operations, with the point end of the pen immersed in ink. Ink may be expelled from the reservoir to refill the collector when it is empty, by holding the pen point up and squeezing the barrel across the slit ends of the nipple valve. In this position the slit will be submerged in the reservoir ink so that the barrel pressure will compress the air in the barrel, open the valve, and force ink up through the axial tube and into the collector.

In still another form to be described, the nipple valve is replaced by an externally operable valve. These forms are shown in the annexed drawings wherein:

Figure 1 is a view mostly in section showing on a much enlarged scale many of the details of the form of my invention first referred to;

Figure 2 is a view on the line 2—2 of Figure 1;

Figure 3 is a view on the line 3—3 of Figure 1;

Figure 4 is a view on the line 4—4 of Figure 1;

Figure 5 is a view on the line 5—5 of Figure 1;

Figure 6 is a detail, end elevational view showing how the ink collector is built up;

Figure 7 is a sectional view of a modification having a manually operable valve control;

Figure 8 is a view on the line 8—8 of Figure 7;

Referring now to the drawings wherein like numbers refer to corresponding parts, 1 is a radially flexible barrel which is removable but force fitted onto a hood 2

which carries the shank 18 of a pen point 4. Barrel 1 may be of suitable transparent material. Within the hood 2 is mounted an ink collector 5 to which axially extends a tube 6 that is positioned in a plug 7 that fits ink tight at the upper end 8 of the hood 2. The tube 6 has an ink tight joint with the plug 7 and extends upwardly into a soft rubber cylindrical member 9 which has radially located slots 10 extending longitudinally of its length. The member 9 also has a centrally located slit 11. As shown in Figures 2 and 3 the slots 10 are arcuately displaced from the direction of the plane of the slit by an angle of 90°, thus permitting air and ink or air to flow through them to and from the main section of the barrel 1 to the top end of the barrel above the valve slit 11.

The ink collector 5 consists of a spirally wound sheet 12 of suitable material which may be celluloid or Lucite. The cylinder 12 is about ¾ of an inch long and has cemented at one end a disc 13 and at the opposite end a disc 14. These discs 13 and 14 preferably engage the inner wall of the hood portion 8, while the outside diameter of the cylinder 12 is a few mils less than the internal diameter of the hood. This cylindrical collector may be made by rolling the material around a mandrel with a spacer strip of any suitable material. After the cylinder is wound it can be secured in its wound position in any satisfactory manner as by an elastic tube and the complete spiral roll treated in hot water to soften and form it, if made of plastic instead of a suitable metal. Then it is cooled as in cold water which will cause it to take a set form and the spacer strip is then removed by unwinding or pulling it out from the cylinder which will then take its set form, at which time the end discs 13 and 14 are cemented in place preferably under pressure in order to insure permanence and uniformity of the spiral turns of the collector. The discs 13 and 14 are made of a material which may be softened, if the collector 5 is made of plastic, in any suitable manner and forced into position as above noted. Extending axially through the collector 5 and snugly fitting in the discs 13 and 14 is a tube 17 that extends to a point adjacent the nibs 4 of the pen. The discs 13 and 14 are slotted at 15 to allow air and ink to move into the collector 5 from the passageway 16 between the disc 14 and the plug 7, the tube 6 terminating not quite flush with the inner end of the plug 7. Around the shank 18 of the pen is an annular ink space 19, the shank having a hole therein to connect this outer space with the inner space 21 around the tube 17. The thickness of the annular space around the shank of the pen and between the turns of the spiral collector 5 are such that these spaces will support by capillary attraction a column of ink extending from adjacent the pen nibs 4 to the collector space 16 adjacent the disc 14 without flooding and so that ink will feed without over flowing to the point as the collector supply is written out. Since this column of ink has a total length of 1⅜" to 1½" the thickness of the spiral capillary spaces in the collector 5 should be no larger than about 8 mils, while the annular spaces around the shank of the pen may have a thickness of about 5 or 6 mils to insure penward flow of the ink from the collector. The radial slots in the lower collector end disc 13 should be about 7 or 8 mils in thickness, while the space 16 between disc 14 and plug 7 should be sufficient to provide free access of air to the top side of the collector with the pen point in down position so that air may flow in and out freely to the top of the collector through the axial tube 17 as the collector ink is written out, thereby preventing flooding or refusal to write due to temperature and/or external barometric pressure changes.

Since slit **11** is normally closed by the compliance of the rubber of the plug **9**, ink and air are normally sealed in the reservoir until the valve **11** is opened by lateral squeezing of the barrel, adjacent the valve.

From the foregoing, it will be seen that in this form of my invention the pen may be filled with its point down in an ink vessel and that the collector **5** may be filled with the point up from the barrel reservoir R.

In Figure 7 the control valve for the pen is manually operated and positioned in the outer end of the barrel **1**. In this construction the outer end of the barrel is closed by a cap **22** having a hollow shank **23** extending a substantial distance into the barrel **1**. Inside the upper end of the shank **23** is located a plug **24** preferably of soft rubber through which, as well as through the end of the cap **22**, extends an operating rod **25** having a knob **26** fastened thereto. The rod **25** has a point end **27** that fits ink tight into a valve seat in a soft rubber tube **28** that is carried by a plug **29** fastened within the inner end of the shank **23**. Plug **29** has a plurality of slots **30** therein. The tube **6** which may be of metal or some other equivalent material extends a substantial distance into the inner end of the tube **28** and is preferably cemented therein. Rod **25** has fastened thereto, a collar **31** which is in engagement with the inner surface of the plug **24**.

In this construction the pointed rod end **27** and the rubber tube **28** form a valve which is normally closed by the plug **24** that has inherent spring action whereby after the rod **25** is pulled outwardly, to open the valve, the plug **24** is compressed but when knob **26** is released, the spring action of the plug **24** will return the rod to closed position as shown in Figure 7.

After opening the valve by pulling out on the knob **26**, the barrel is squeezed which will expel air in filling the reservoir R, or ink when the collector is being filled. In this construction the valve is ink-tight and none can escape through the rubber plug spring **24** or around it to the outside. Preferably the rod **25** should be of stainless steel, Lucite or other non-corrosible material.

It will be readily appreciated that many of the details may be varied without departing from the spirit of my invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. A fountain pen as herein described comprising a hood having a barrel attached thereto at one end and a pen point at its opposite end, said barrel being radially flexible but longitudinally rigid, a circular ink collector comprising a strip of material rolled up in arcuately suitably spaced relationship about an axis that extends longitudinally of the pen, each end of the collector having a disc fastened thereto, these discs being located in close proximity to the inner wall of a part of the hood, a feed tube extending axially through the collector to a location near the pen point while the shank of the pen point extends preferably inwardly to the disc nearest the inner end of the pen shank, the pen shank and feed tube defining therebetween a circular ink space, the hood and the pen shank defining therebetween a circular space outside the pen shank, the pen shank having a hole therethrough to connect said inner and outer circular spaces, each of said discs having a plurality of radial slots extending from their peripheries to points adjacent said tube, a plug secured in the inner end of the hood in a small spaced relation to the inner positioned disc, a plug of suitable soft material fastened within and near the outer end of the barrel, a nipple type valve formed in the outer end of this plug, a second feed tube extending preferably through the plug in the hood through the barrel and into said soft plug in the barrel to cooperate with said valve, this last mentioned plug having at least one opening therein as and for the purpose described.

2. A fountain pen as set forth in claim 1 further defined in that the plug having the nipple valve therein is of soft rubber whereby pressure in the right direction on the barrel will cause the valve to open above said co-operative feed tube.

3. A fountain pen having a hood carrying a pen point at one end and an ink barrel at the other end, said barrel being radially flexible but longitudinally rigid, an ink collector carried within the hood adjacent the inner end of the shank of the pen point, said collector comprising a piece of suitable material wound up with the turns in radially spaced relationship, end plates or discs fastened to said turns for holding them in radial spaced position, the end plates or discs having a plurality of radial slots for the purpose described, a plug secured to the inner end of the hood at a distance from said collector adequate to leave a small space between its end nearest the collector and the discs at this end of the collector, a plug of suitable soft material near the outer end of the barrel and having at least one slot along its length, a valve located in this last mentioned plug, a feed tube extending from said valve into the first mentioned plug and communicating with the space between the inner end of this plug and the adjacent disc end of the collector, the valve being manually operable as and for the purposes described.

4. A fountain pen as set forth in claim 3 further defined in that the valve is operated by pressure applied to the barrel in a certain direction.

5. A fountain pen having a radially flexible barrel reservoir, a hood attached to the barrel, a collector unit within the hood composed of a sheet of suitable material rolled up in spaced turns with a disc at each end to hold the turns in operative position, the discs having air and ink passages therethru, the collector having a centrally located longitudinal hole thru its length, the hood carrying at its free end a pen point having a shank extending to a point closely adjacent the outer end of the collector, a tube extending from near the pen nibs thru the shank of the pen and thru the centrally located hole in the collector, the hood and the shank of the pen defining therebetween a circular space around the shank of the pen for the greater part of its length while the shank has at least one hole therethru opening into said space, a plug carried by the hood at its interior end and spaced a short distance from the inner end of the collector, a tube extending from said plug toward the free end of the barrel and in sealing engagement with said plug whereby said tube comprises the only means for passing air and ink from the reservoir by way of its remote end at the upper end of said barrel to said collector, a plug mounted on the free end of said barrel for supporting said air and ink tube and carrying a valve, said valve being manually operable for controlling the passage of air and ink through said tube while said plug has at least one slot along its edge for the purpose described.

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