

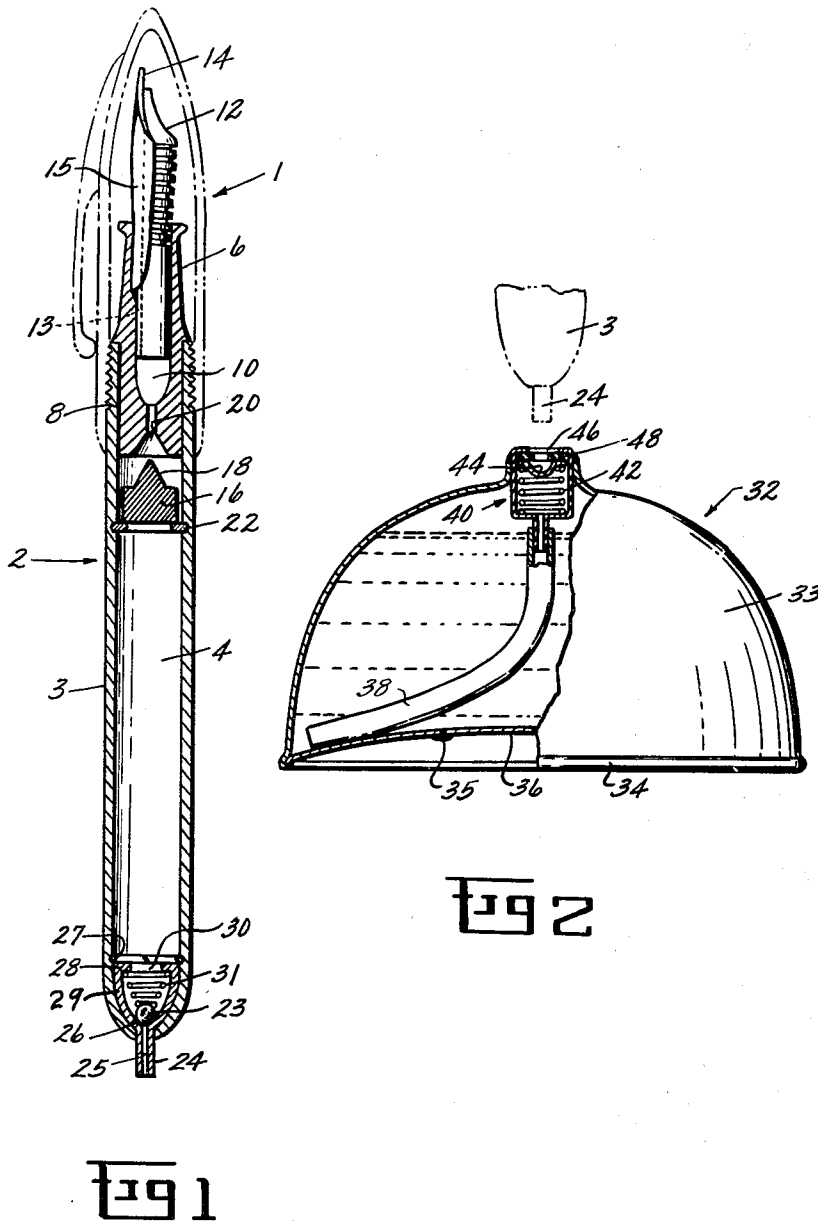
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COMBINATION PEN AND PRESSURIZED FILLING MEANS

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COMBINATION PEN AND PRESSURIZED FILLING MEANS

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5 Claims. (Cl. 120—48)

My invention relates to that class of devices known as pen and writing fluid combinations and more particularly to the pressurized feeding mechanism therefor.

Before my invention, so far as I am aware, there has never been a combination pressurized writing fluid container and a mating self-storage writing pen, known popularly as a fountain pen.

It is the principal object of my invention to provide a fountain pen in combination with a pressurized writing fluid container which is adapted to fill the pen by forcing the writing fluid out of the container and into the pen upon mating the end of the pen with the top of the container.

It is a further object of my invention to provide a pen adapted to receive writing fluid under extreme pressure.

It is a further object of my invention to provide a pressurized container for dispensing writing fluid as required.

It is a further object of my invention to provide a combination pen and its ink container which by pressing the reverse end of the pen into the container quickly and easily fills the pen.

It is a still further object of my invention to provide in combination a fountain pen and a container adapted to hold writing fluid under extreme pressure and to supply said writing fluid to said pen; the pen and the container being provided with mating means to accomplish the transfer of writing fluid from the container to the pen as required.

My means of accomplishing the foregoing objects may be more readily apprehended by having reference to the accompanying drawings in which:

Figure 1 is a vertical sectional view of one form of a pen embodying my invention;

Figure 2 is a vertical view partly in section showing my pressurized writing fluid container.

Similar numerals refer to similar parts throughout the entire specification.

As shown in the drawings I provide a fluid ink fountain pen indicated generally as 2 having the usual cap and clip indicated in phantom generally as 1.

The pen 2 has a barrel 3 with a fluid ink reservoir 4. The reservoir 4 may, of course, be formed of a deformable sack or bag, but for convenience I have shown the reservoir 4 as being integral with the barrel 3.

The pen 2 is provided with the usual ferrule 6 which may be press-fitted into the barrel 2 as indicated generally as 8. The ferrule 6 has a cylindrical aperture 10 with a passage terminating in a valve seat 20.

I provide the usual pen point 14 held in place by the tapered nib 12 fitted into the cylindrical aperture 10 of the ferrule 6 as shown. The usual ink fissures 15 and air bleed passages 13 are grooved into the nib 12 which permits access to the reservoir 4 from the ambient air through the passage as shown for vent purposes as well as to supply writing fluid to the pen point 14.

I provide a float 16 with a needle 18 adapted to close

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the valve seat 20 for purposes which will be apparent. A float stop 22 is provided in the form of an O ring which may be cemented or otherwise attached to the reservoir 4 as shown.

At the closed end of the barrel 3 opposite the pen point 14, I provide a probe 24 having a passage 25 sealed by a ball check valve 23 which is urged against the shoulders 26 by a spring 31 based upon the shoulders 28 of the housing 29 thus closing the passage 25. The base ring 27 holds the housing 29 in the barrel 3 substantially as shown.

It is clear that by this construction I have provided direct communication to the reservoir 4 from outside the pen through the probe 24 when the ball check valve 23 is moved inwardly against the spring 31 compressing the spring 31 sufficiently to clear the passage 25.

As shown in Figure 2 I provide a container 32 which is adapted to hold writing fluid under pressure. In practice I provide that the container 32 is of sufficiently strong material to withstand considerable internal pressure. It is important in this regard to employ a metal, such as stainless steel, that is substantially impervious to the corrosive action of many writing fluids. For instance, it is well known that many writing fluids have a corrosive or otherwise deleterious effect upon metal such as steel or brass. To overcome this adverse effect, it is usual to spray-coat the inside of such containers with a coating of inert plastic such polyethylene or to provide an inside deformable sack of like material that will hold the writing fluid without adverse effect.

Due to the high pressures in such containers, the gas employed as charging means must be carefully selected according to its characteristics. There are many such gases that are suitable for this purpose. However, it is desirable, of course, with a writing fluid such as ink to keep any tendency of the ink to foam or bubble to a minimum. It is undesirable, for example, to have the gas partially liquify and enter solution with the writing fluid while inside the container with resultant expansion upon release to atmospheric pressure and formation of bubbles or foam in the writing fluid. In addition, the corrosive effect of certain gases in liquid form upon some metals must be considered in choosing the metal for the container.

A further consideration relevant to selection of a proper gas is the undesirability of chemical reaction between the gas and the writing material employed either as the gas dissolves in the material or the gas in liquid form mixes with the fluid. Obviously, these considerations are relevant both to the choice of a proper gas and also to the pressure employed.

In my container 32 I provide a convex bottom 36 with a pressure seal 35 through which the container may be supplied with the writing fluid and charged with a suitable gas. I provide a discharge valve chamber 40 which may be sealed in the container 32 by any of the usual means such as press-fitting it into the top of the container substantially as shown. I have not shown details of such a mounting since it is so well known in the industry. I provide a discharge cup valve 44 which is urged against the washer 48 by a spring 42 resting on the inwardly turned base of the chamber as shown. The washer 48 is held against the top of the valve chamber and is accurately constructed to form a fluid-tight seal when the probe 24 is inserted through the hole 46 as illustrated in phantom. A supply tube 38 supplies writing fluid to the discharge chamber 40 and is preferably made of a flexible material such as a flexible inert plastic. However, a non-corrosive metal could be employed, if desired.

While I have shown the lip 34 of my container 32 as a normal bead, it is clear that the lip 34 could be enlarged

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if desired. This would increase the base of the container 32, adding thereby to the general weight which would be desirable if the internal pressure were sufficiently low to permit the construction of my container 32 of lighter metals. A relatively heavy container 32 is desirable since my invention is designed to dispense with any additional special apparatus for filling the pen. My invention permits one-handed filling of the pen 2 because of my rendering the container 32 so heavy as to be substantially immovable.

In order to fill the pen 2 it will be clear that the pen 2 is held vertically (as shown in phantom in Figure 2) over the valve 44 and the probe 24 is inserted into the hole 46 of the washer 48, in which position the probe rests upon the valve 44. Further depressing of the valve 44 by the probe 24 will open a direct path from the writing fluid in the container 32 to the ball check valve 23 in the pen 2 through the supply tube 38, the discharge chamber 40 and the discharge valve 44. The spring 31 is designed to yield to the pressure of the writing fluid as it flows from the container 32 thus exerted on the ball check valve 23, thereby permitting the writing fluid to flow into the reservoir 4.

When the writing fluid in the reservoir 4 reaches the float 16, it moves with the writing fluid as the fluid rises beyond the point in the reservoir 4 where the float 16 rests upon the stop 22. When sufficient writing fluid enters the reservoir 4 from the container 32 the float 16 closes the valve 20 by means of its needle 18, thus preventing any over-filling of the pen 2. Air is permitted to escape through the bleed passages 13 in the nib 12 ahead of the writing fluid as it enters the reservoir 4. The probe 24 is then withdrawn from the hole 46 in the washer 48 and the pen is ready to write. Since a completely full pen tends to leak, I have provided that the float 16 will withdraw from the valve seat 20 when the pen is held in a writing position, thus permitting the aperture 10 to be filled immediately with writing fluid because the float 16 rises to the stop 22, thus uncovering the valve 20 and permitting the normal flow of the writing fluid to the point 14 while air replaces consumed writing fluid through the fissures 13. By this means I have prevented the pen from becoming too full.

While I have disclosed my preferred embodiment, I realize my probe and discharge chamber arrangement may be reversed by appropriate engineering changes without departing from the scope of my invention.

What I regard as new and desire to protect by Letters Patent is:

1. A writing pen adapted to be applied to a pressurized ink container holding ink under high pressure gas for filling said pen, comprising a barrel reservoir carrying a writing point on one end and an ink supply probe on the other end, valve means within said reservoir communicating with said ink supply probe, means normally urging said valve means to closed position, a float in said barrel reservoir located between the said valve means and said writing point and forming a fluid seal

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between said reservoir and the writing point, said probe coacting with said pressurized ink container for effecting transfer of ink under pressure from said pressurized container into said reservoir through said valve means while said probe is connected with the pressurized ink container, said float being floatable on the ink delivered to said reservoir for cutting off the ink to the writing point when the ink from said pressurized ink container fills said reservoir while said probe is connected with the pressurized container and being floatable in the ink fed from said reservoir to said writing point when said probe is disconnected from said pressurized ink container and said reservoir reversed in position and said writing point used in writing position.

2. A writing pen adapted to be applied to a pressurized ink container holding ink under high pressure gas for filling said pen, as set forth in claim 1, in which said valve means consists of a spring actuated ball valve normally closing said probe and wherein said ball valve is displaceable against the action of said spring while effecting the filling of said reservoir under the pressure of ink from the pressurized ink container.

3. A writing pen adapted to be applied to a pressurized ink container holding ink under high pressure gas for filling said pen, as set forth in claim 1, in which said barrel reservoir contains a pair of spaced stops located adjacent the writing point end thereof and wherein said float is displaceable in the ink which fills said barrel reservoir to opposite limiting positions determined by the locations of said stops.

4. A writing pen adapted to be applied to a pressurized ink container holding ink under high pressure gas for filling said pen, as set forth in claim 1, in which said barrel reservoir includes a frusto-conical shaped valve seat in the end thereof adjacent said writing point with a channel for ink extending from said seat to said writing point and wherein said float has a frusto-conical end thereon adapted to enter said frusto-conical seat for closing the channel for ink extending from said valve seat.

5. A writing pen adapted to be applied to a pressurized ink container holding ink under high pressure gas for filling said pen, as set forth in claim 1, in which said reservoir includes an internal O-ring adjacent the probe end of said reservoir, said O-ring operating to maintain said valve means within said reservoir.

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