Sept. 5, 1950 J. V. DEARMAN 2,521,285

FOUNTAIN PEN

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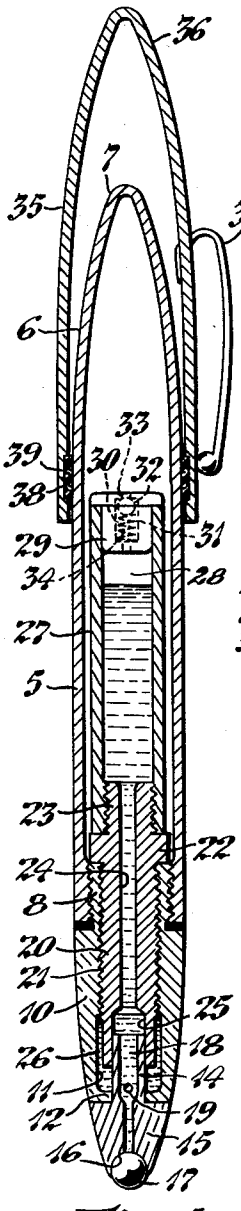


Fig. 1.

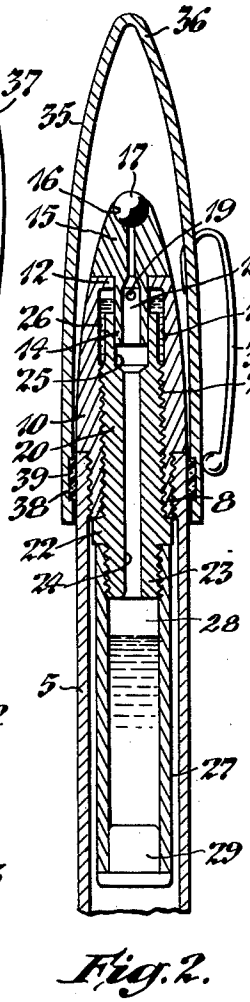


Fig. 2.

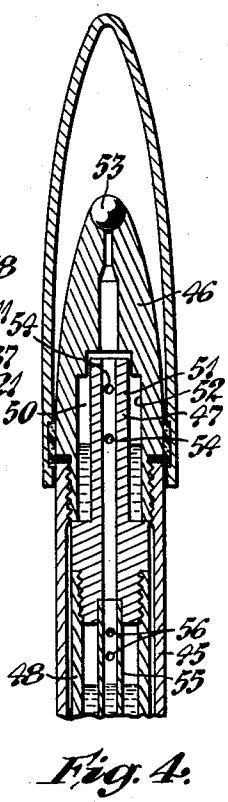


Fig. 4.

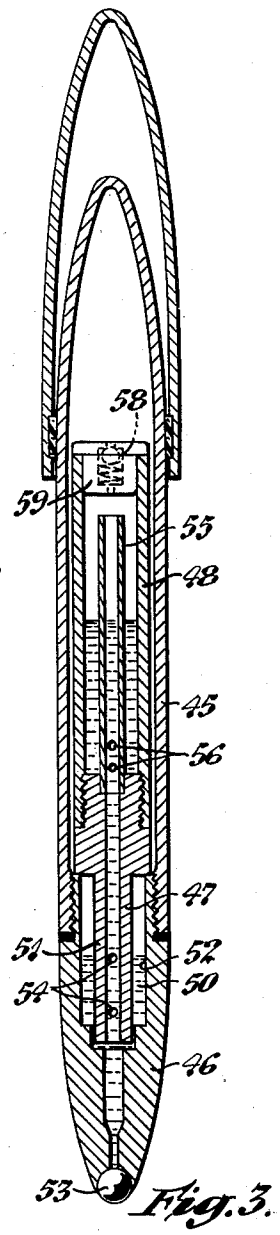


Fig. 3.

Inventor:
JAMES V. DEARMAN
By William E. Hall
Attorney.

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FOUNTAIN PEN

James V. Dearman, Hollywood, Calif.

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4 Claims. (Cl. 120—42.16)

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This invention relates to writing or marking devices, and particularly to fountain pens of a type employing a ball point and a reservoir for supplying writing fluid to said ball point.

Fountain pens provided with a ball point and a reservoir, for containing a supply of ink paste and adapted to supply the paste to the ball point, have recently been used with some degree of success. However, it has been found that when ink paste is employed as the writing medium, it is necessary to provide means for forcibly feeding the paste from the reservoir in order to maintain an adequate supply adjacent said ball point, and such feeding means are not only complicated in construction, expensive to make and assemble, but are subject to breakage or getting out of order. Moreover, such feeding devices are usually manually operated or periodically adjusted to control the feeding of the paste to the ball point, and if this operation is neglected the pen will run dry, thus rendering the pen inoperative until the flow of paste is again effected.

I have determined that ink of a free flowing, relatively high viscosity provides an especially efficient and desirable writing or marking medium, inasmuch as such ink will flow freely under the influence of gravity without leaking from the tip end of the pen. Since such ink is adapted to flow under the action of gravity, it is unnecessary to provide mechanical ink-feeding means. It is therefore an object of my invention to provide a fountain pen having a reservoir adapted to contain a supply of ink of relatively high viscosity and a ball point to which the ink flows under the influence of gravity to be applied to the paper or other writing surface.

Another object is to provide a fountain pen of the type referred to in which the reservoir comprises a tubular cartridge adapted to contain the ink and to be readily inserted into and removed from the pen body or shell.

Another object is to provide a fountain pen, of the type referred to, having means for venting the reservoir and passages through which the ink flows whereby to avoid air traps which would prevent proper ink flow.

Another and important object is to provide a fountain pen, of the type referred to, which is provided with an auxiliary reservoir arranged in close proximity to the tip of the pen and adapted to retain a supply of ink when the pen is inverted, so that when the pen is again returned to writing position ink will be immediately available and supplied to the ball point for writing or marking purposes.

Another object is to provide a fountain pen, of

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the type referred to, which is of relatively simple construction, devoid of mechanical ink-feeding devices, or other moving parts, and one which is highly efficient in performing its intended function.

Further objects of my invention are set forth in the following specification, which describes two embodiments thereof, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a longitudinal sectional view of one embodiment of the improved fountain pen, showing it in writing position;

Fig. 2 is a longitudinal sectional view of the tip end of the pen, illustrating the manner in which ink is retained in an auxiliary reservoir when the pen is inverted from writing position;

Fig. 3 is a longitudinal sectional view of a modified form of my improved pen, showing the pen in writing position; and,

Fig. 4 is a longitudinal sectional view of the tip end of the pen shown in Fig. 3, and illustrating the pen in inverted position.

The improved fountain pen comprises, in general, a casing or shell, a tubular tip member secured to said shell and rotatably supporting a ball point, a tubular member connected to said tip member, a cartridge reservoir connected to said tubular member within said shell for containing a supply of ink of relatively high viscosity, said ink being adapted to flow from said reservoir through said tubular member to said tip member under the influence of gravity when the pen is held in writing position, a reduced portion formed integral with said tubular member and extending into said tip, said reduced portion cooperating with the interior of the tubular tip member to provide an annular auxiliary reservoir into which ink flows from said cartridge reservoir, and said auxiliary reservoir being adapted to retain a quantity of ink within said tip when the pen is inverted from writing position whereby to immediately supply ink to the ball point when the pen is returned to writing position.

Referring first to Figs. 1 and 2 of the drawings, one embodiment of my improved fountain pen comprises a casing or shell 5, preferably of cylindrical form and having a tapered portion 6 terminating in a round closed end 7. The shell 5 has internal screw threads at its open end to adapt the shell to receive the reduced threaded portion 8 of a tubular intermediate member 10 of substantially frusto-conical form. The member 10 has a bore 11 which is screw-threaded throughout the greater part of its length and

provided with a wall 12 at its small end. The wall 12 has an axial aperture adapted to receive the reduced tubular portion 14 of a tip member 15. The tip member 15 has a substantially semi-spherical recess or socket 16 in its outer end adapted to receive a hardened metal ball 17, which constitutes the pen point, the ball being rotatably retained in the socket by spinning the side walls of the recess thereagainst. The tip member 15 is provided with an axial bore 18, which is reduced slightly in diameter toward its outer end. One or more small holes or ports 19 are provided in the annular wall of the reduced tubular portion 14 for a purpose to be later explained. Between the outer periphery of the tubular portion 14 and the bore 11 of the intermediate member 10 is an annular space 26 constituting an auxiliary ink reservoir.

A tubular conduit member 20 has an externally screw-threaded portion 21 adapted to be screwed into the screw-threaded bore 11 of the intermediate member 10, said member 20 having a peripheral flange 22 adapted to abut the inner end of the member 10. The inner end 23 of the member 20 is reduced in diameter and this end is externally screw-threaded. The conduit member 20 is provided with an axial bore 24 which is enlarged in diameter at its outer end, as indicated at 25, to adapt it to receive the inner tabular portion 14 of the tip member 15.

A tubular reservoir member 27 has an axial bore 28 constituting a reservoir and is provided with internal screw threads at one end to adapt it to be screwed onto the inner end 23 of the conduit member 20. The inner end of the reservoir member 28 may be closed by any suitable means such as a plug 29, and preferably the plug is provided with a one-way valve 30 comprising a port 31 in which a ball 32 is slidably arranged and normally forced outwardly into engagement with a shoulder 33 by means of a coil spring 34 pocketed within the port. The valve 30 functions to permit ingress of air into the reservoir 28 to replace ink used during writing and to prevent suction in said reservoir which would prevent proper flow of ink to the ball point.

When the fountain pen is not in use, its tip end may be protected by a tubular cap member 35 having a substantially conical end 36 adapted to enclose the tip end when the cap is slid thereover as shown in Fig. 2. The cap 35 may be provided with a usual clip 37 and with a groove 38 in its interior, in which is held a ring 39 made from cork or other compressible friction material and adapted to grip the exterior of the shell 5 to retain the cap in place thereon. The improved fountain pen having been described in detail, its method of operation will next be explained.

To fill the fountain pen with a supply of ink, the cap member 35 is first removed from the shell 5 and the shell then unscrewed from the intermediate member 10. The reservoir member 27 is next unscrewed from the conduit member 20 and its interior or bore 28 filled with a supply of ink of relatively high viscosity. The reservoir member 27 may be supplied as a refill cartridge containing enough ink to last several months under ordinary use, and in this case the cartridge would have a removable and disposable closure covering its open end. The conduit member 20 is next screwed into the open end of the reservoir member 27 and the shell 5 finally replaced by screwing it onto the threaded end of the intermediate member 10.

When the fountain pen is held in the position

illustrated in Fig. 1, the relatively thick ink will flow downwardly from the reservoir 28 through the bore 24 of the conduit member 20, and thence through the bore 18 of the tip member 15 into contact with the ball 17. The ink will also flow laterally through the ports 19 into the auxiliary reservoir 26. The pen is then ready for use, and to mark or write the pen is manipulated in the same manner in which a pencil is operated, with the ball point 17 rolling along the writing surface. As the ball 17 rolls upon the writing surface, it continuously picks up ink and applies the ink to the surface. As the ink is used, it is replaced by air which enters the reservoir 28 through the one-way valve 30. Since the ball 17 closely fits the socket 16, the possibility of the relatively thick ink leaking from the tip is entirely avoided. When the writing is completed and it is desired to store the pen in a pocket, the cap member 35 may be reapplied over the tip end of the pen and the entire assembly inverted to be slid into the pocket, with the clip 37 engaging the rim of the pocket to retain the pen therein.

When the pen is carried in the inverted position, shown in Fig. 2, the ink has the tendency to flow from the tip through the bores 18 and 24 to return to the reservoir 28. However, the ink contained in the auxiliary reservoir 26 is trapped therein and thus retained at a point in close proximity to the tip of the pen. It is apparent, therefore, that when the pen is later reapplied to use by turning it to the position shown in Fig. 1, the ink contained in the auxiliary reservoir 26 will immediately flow through the ports 19 and into the bore 18 to contact the ball point 17, so that an adequate supply of ink is always available for writing even though the pen has been held in inverted position over a long period of time.

While the tip end of the pen has been herein described as comprising two parts, namely, the intermediate member 10 and the tip member 15, it will be apparent that the tip may be made as a unitary structure, the two-part construction shown in Figs. 1 and 2 permitting the use of separate metal and plastic members.

Referring now to Figs. 3 and 4, a slightly modified form of fountain pen is illustrated, said pen comprising a shell 45, tip member 46, conduit member 47, and reservoir member 48. In this alternating form of pen, the intermediate member is dispensed with and the annular space 50, occurring between the reduced end 51 of the conduit member 47 and the counterbore 52 of the tip member 46, is utilized as an auxiliary reservoir which functions to retain an auxiliary supply of ink closely adjacent the tip of the pen in readiness to immediately supply the ball 53 with ink when the pen is held in writing position, the ink flowing into and from the reservoir 50 through holes 54 in the conduit member 47. A tube 55 is attached to the inner end of the conduit member 47 and projects upwardly into the reservoir member 48. The tube 55 has lateral holes 56 adjacent its lower end for permitting ink to flow downwardly from the reservoir and for allowing air to escape from the tip of the pen into the reservoir. Ink used during the writing is replaced by air which enters the reservoir member 48 through a one-way valve 58 in the plug member 59.

It will be observed from the foregoing that my invention provides a fountain pen employing a ball point and adapted to use ink of relatively high viscosity. Such ink is adapted to flow with-

in the pen under the influence of gravity and yet is too thick to escape around the ball point, thus insuring against leakage. As a particular feature of improvement, the present improved pen is provided with an auxiliary reservoir arranged in close proximity to the tip and adapted to retain a supply of ink when the pen is inverted from writing position. Through this provision, a supply of ink will be immediately available when the pen is applied to use after having been stored in inverted position in a pocket of the user. Since the ink is comparatively free flowing, the need for ink-feeding mechanism is eliminated. The pen is thus made simpler in construction, lighter in weight, and less expensive to manufacture. The improved pen may contain a supply of ink which will last over a period of several months under ordinary use, and when the supply is exhausted it may be replenished by merely inserting a fresh cartridge of ink.

While the improved fountain pen has been herein shown and described as embodied in two preferred forms of construction, by way of example, it is to be understood that other modifications may be made in the structure without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect,

I claim:

1. A fountain pen, comprising: a reservoir means having a main reservoir, adapted to contain a supply of free flowing ink, and a writing point at one end communicating through a passage in said means with the reservoir, said means having an auxiliary reservoir located relatively near the writing point and also having a restricted port connecting the auxiliary reservoir with the passage, said ink being adapted to flow from said main reservoir through the passage to the writing point and also into said auxiliary reservoir when the pen is in a writing position, said auxiliary reservoir, when the pen is inverted from a writing position, providing an ink-retaining pocket relatively near the writing point and below the port, said auxiliary reservoir serving immediately to supply ink to said point when the pen is in a writing position.

2. A fountain pen, comprising: a reservoir member having a main reservoir adapted to contain a supply of free flowing ink, and a tip connected to the reservoir member and provided with a longitudinal extension with a passage therethrough, said tip also having a writing point at one end communicating with said passage and provided with an annular space surrounding said extension and constituting an auxiliary reservoir, said extension being provided with a port in its wall connecting said passage with said auxiliary reservoir, said reservoir member having a conduit connecting the main reservoir with the passage of said extension, said ink being adapted to flow from said main reservoir through the conduit and passage to the writing point and also into said auxiliary reservoir when the pen is in a writing position, said auxiliary reservoir, when the pen is inverted from a writing position, providing an ink-retaining pocket relatively near the writing point and below the port, said auxiliary reservoir serving immediately to supply ink to said point when the pen is in a writing position.

3. A fountain pen, comprising: a reservoir member having a main reservoir adapted to contain a supply of free flowing ink, and a tip connected to the reservoir member and provided with a bore and with a counterbore at its inner end, said tip also having a writing point in its outer end communicating with said bore, the reservoir member having a tube, one end connected to the main reservoir and the other end extending into said counterbore, the latter portion of the tube having a port connecting its interior with said counterbore, the space between said exterior of said tube and the sides of the counterbore constituting an auxiliary reservoir, said ink being adapted to flow from said main reservoir through said tube to the writing point and also into said auxiliary reservoir when the pen is in a writing position, said auxiliary reservoir, when the pen is inverted from a writing position, providing an ink-retaining pocket relatively near the writing point and below the port, said auxiliary reservoir serving immediately to supply ink to said point when the pen is in a writing position.

4. A fountain pen, comprising: a reservoir member having a main reservoir adapted to contain a supply of free flowing ink, and a tip connected to the main reservoir member and provided with a bore and having a writing point in its outer end communicating with said bore, said tip having walls defining an auxiliary reservoir, the reservoir member having a tube, one end of which is connected to the main reservoir and the other end of which extends into the auxiliary reservoir, said tube being provided with a port in its wall connecting the interior thereof with the auxiliary reservoir, said ink being adapted to flow from said main reservoir through said tube to the writing point and also into said auxiliary reservoir when the pen is in a writing position, said auxiliary reservoir, when the pen is inverted from a writing position, providing an ink-retaining pocket relatively near the writing point and below the port, said auxiliary reservoir serving immediately to supply ink to said point when the pen is in a writing position.

JAMES V. DEARMAN.

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